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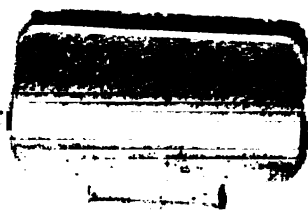
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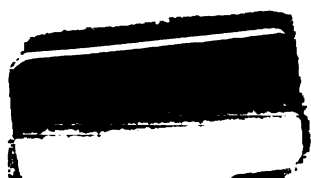
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COAL MINES INSPECTION:

ITS HISTORY AND RESULTS.

BY

R. NELSON BOYD, F.R.G.S., F.G.S.



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TO

SIR GEORGE ELLIOT, BART., M.P.,

MEM. INS. C.E., F.R.G.S., F.G.S.,

EX-PRESIDENT NORTH OF ENGLAND INSTITUTE OF MINING AND
MECHANICAL ENGINEERS, &C., &C.,

THIS VOLUME IS INSCRIBED

AS A TRIBUTE OF RESPECT AND REGARD

BY THE

AUTHOR.

PREFACE.

THE study of a subject so special as the legislation affecting the coal mines of the country might, at first sight, appear wanting in interest. But it involves inquiry into the past and present condition of a large number of workers, and into the manner of prosecuting a most important, as well as dangerous, trade.

The number of persons directly employed at collieries is about half a million, and the number dependent on the associated industries is very much larger. Few authors have written either on the condition of the great mass of the employed, be they denominated operatives, artisans, labourers, miners, or working-men; while the Acts passed from time to time for their benefit or protection have attracted but little general attention.

It may seem strange to apply the term *protection* to measures affecting workpeople. But it must be remembered that in the struggle for commercial success, especially in cases where capital was limited or insufficient, employers have been frequently led to act without due regard to the hardships or even sufferings of the employed.

The lowering of the social status of the masses through neglect and oppressive labour, threatened a national danger, to avert which required legislative interference. The difficulty which the legislature had before it, was to find the happy medium, so as to afford the necessary protection to the employed without imposing unjust or prohibitive restrictions on the owners of capital and employers of labour. From the commencement of this century Parliament has

been more or less engaged in framing Acts for the benefit of the employed, and the improvement of the relations between masters and men. Such measures are more technical and social, than legal, as they are framed to remedy existing, and prevent possible, abuses, and must be based on a knowledge of the details of each trade affected.

In the Coal Mine Regulation Bills the question of accidents had to be elucidated, and the modes of working, lighting, and ventilating the mines thoroughly considered, before a legislative enactment could be framed which would at all answer the purpose of protecting the employed against social degradation, such as the employment of women and children underground, against unfair dealing, such as the truck system, and against undue waste of life and health in the underground workings.

The consideration of these subjects, combined with an endeavour to trace the origin of the causes, both physical and social, which led to our present system of mines regulation and inspection, induced me to gather together some facts, which, though well known, have not been as yet presented in a collective form. Thinking that the information might be of use to those directly interested in the working of coal mines, and, perhaps, of some interest to the general public, I have ventured to arrange my notes in the form of an historical narrative, without, however, pretending to present a complete treatise on the subject.

To have entered fully and comprehensively into these matters would have required more leisure than I have at my disposal ; to treat of them with unblemished correctness and clearness would necessitate more knowledge and capacity than I am conscious of possessing.

R. N. B.

7, Westminster Chambers,
Victoria Street,
February, 1879.

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COAL MINES INSPECTION.

CHAPTER I.

CONDITION OF THE COLLIERY POPULATION PREVIOUS TO THE
PRESENT CENTURY.—EARLY COAL WORKINGS—ACTS OF THE
SCOTCH PARLIAMENT.—EMANCIPATION OF THE COLLIERIES.

2 IN order to ascertain the causes which led to the interference of the Legislature in the trade or art of coal mining, it is necessary to cast a retrospective glance over the condition of our mines and their workers previous to any direct Parliamentary enactment.

In the consideration of this part of the subject, the enquirer cannot fail to be struck by the scantiness of the records relating to the condition of the successive generations of labourers, who from an early period obtained their livelihood by working our coal pits. Historians scarcely condescend to notice the development of this industry or the circumstances of those employed in it; and even the local annals of the districts where coal seams had been early discovered and worked, contain but sparse notices of those who

laboured in them. The statutes of the realm, until a comparatively recent time, are a blank as far as the interests of mines and miners are concerned, if we except some Acts of the Scottish Parliament passed during the 17th century, which, however, are noteworthy for the severity they shew towards the coal workers. These observations are applicable not only to colliers, but to the working population in general, of whom we possess historically but imperfect and scant knowledge.

It is only within recent years, and mainly owing to Royal Commissions and Parliamentary Committees, that we have acquired any accurate knowledge of the habits, customs, and inner life of the labouring class. Few authors have devoted their pen to this subject, and those few have been hampered by lack of data. Sir Frederic Eden, writing in 1797 on the history of the poor, and speaking of their early history, says: "I was persuaded that the scanty materials which were to be found in our old chroniclers and annualists would necessarily confine that part of my subject to a very narrow compass." The same may be said by any writer compiling the early story of any division of the labouring part of the community. As Hallam says: "We can trace the pedigree of princes, fill up the catalogue of towns besieged and provinces desolated, describe even the whole pageantry of coronations and festivals, but we cannot recover the genuine history of mankind. It has passed away with slight and partial notice by contemporary writers, and our most patient industry can hardly, at present, put together enough of the fragments to suggest a tolerable clear representation of ancient manners and

social life." The absence of recorded information regarding these work-people is the more singular, as the coal trade rose to importance at a very early period. We have records of coals being dug on the Castle-field at Newcastle-on-Tyne as early as 1239, and of several charters being granted to the inhabitants of that town for digging coals during the 14th century, with certain rights for exporting coal to various ports of the kingdom and to Calais. X

These charters were granted to the freemen of the town of Newcastle, in order to enable them the better to pay the fee-farm rent of the town, which had been granted to the "Honest men of Newcastle and to their heirs," in 1213, by King John. Some years later the citizens of Newcastle petitioned for the right to dig coals in the neighbouring frith, in order "the better to enable them to pay their fee-farm rent." In 1245 we find King Henry ordering a vigorous inquisition into the trespasses committed on the king's forests, and among others those concerning sea coal (*carbone maris*) found in the forests. That about this time coal was somewhat largely imported into London is presumable from the existence in 1253 of a street called *Seacole Lane*. The use seems to have been sufficiently general to become objectionable to the inhabitants of the town, or at any rate to the Court party, for so far back as 1307 we find the burning of *sea cole* in London prohibited by Royal proclamation. During the 14th century the coal trade assumed a rapid development in all the coal districts. In 1338 the Abbot of Tinemouth leased a *staith*, or loading-stage for coals, on the River Tyne, at a rent of £40 per annum, and in 1379 a tax of sixpence a ton was

levied on all vessels leaving Newcastle laden with coals.

Although the coal field of the north of England was perhaps the earliest worked, we possess records of other districts of great antiquity, and especially of the Scotch fields. The early working of coal in Scotland may be attributed to the ancient salt factories. These works flourished as early as the reign of David, in 1124—1153, and were at that time a source of revenue to the king and the nobles, and a profit to the monks who farmed them. We have a record of grants of salt works made at that time to different monasteries, and among others one to the monks of Kelso. The waste of the forests in consequence of this trade was felt in the early part of the 13th century, and at that time the value of coal as a fuel was already known in Scotland. In 1291 William de Oberwill granted a charter to the abbot and convent of Dunfermline, bestowing the privilege of working a coal pit wherever they chose, except on arable land; and traces are said to be still extant of these ancient workings. The grant was for the use of the monks only, so that we may infer that at that early period the fuel was considered a luxury, and was, indeed, but little known in Britain. It is interesting to record that about that time, namely, in 1295, Marco Polo returned to Venice, after a long sojourn in Asia, and brought with him the story of the "black stones" found in China, and which burnt like charcoal. The requirements of the salt trade caused a rapid development of the Scotch coal fields, and the demand for the fuel became soon so great that in 1513 an Act was passed prohibiting its export. This was

subsequently confirmed in 1579, and in 1597 it was again ordained that no large coal should be exported on any pretext. Licences to export coal were, however, granted to a few colliery proprietors, who made large fortunes out of the monopoly. This prohibition against the export of coal from Scotland must naturally have assisted the trade of Newcastle, where export was encouraged. But to return to the English coal fields. We find the bailiffs of the Forest of Dean claiming *sea cole* for their use as early as 1232, and the terms "sea cole" and "oare mine" are used in the "Laws and Customs of the Miners of the Forest of Dean," compiled in 1300. In 1322 the coals of Coalbrookdale were being worked, as we find Walter de Caldebroke agreeing to pay six shillings to have a man to dig *carbone muris* for a year in the Brockholes. These, and other facts, shew that at this early period considerable quantities of coals were raised, enough, in fact, to become an object of taxation. Then, in 1422, King Henry levied a tax of twopence per chaldron on all coal loaded in the river Tyne by enfranchised men, and all their keels or boats were ordered to contain exactly twenty chaldrons. In order, however, to evade the tax as much as possible, the Newcastle men made their keels to hold twenty-two or twenty-three chaldrons.

Numerous charters were granted to the Newcastle men from time to time, some indeed of an obstructive character, such as those granted to hoastmen and fitters, who thus became possessed of a vested interest in the coal trade of the river. The restrictions on the vend of coals must have hampered the development of this coal field, and heavily weighted the colliery

proprietors, for Gardner, in 1655, observes: "If the owner of every colliery had free liberty to sell his coals to ships immediately, Tynemouth harbour would afford two hundred thousand chaldrons of coal in the year more than now vended, which would reduce the late exorbitant excessive rate of coals in the City of London."

Nevertheless, the northern coal field was more rapidly developed than any of the other coal producing districts in Great Britain. This was, in a great measure, due to the rapidly increasing consumption of coal in London, for the prohibition did not last long, and the entire supply was obtained from the Tyne and Wear until the recent introduction of railways.

The existence of the fuel was well known during the 17th century, when the Midland coal fields began to show great activity. In a geographical description of England, published in 1615, the county of Durham is described as "bringing forth coal, whereof the county is plentifully stored, and groweth so near the upper surface of the earth that the cart wheels do turn up the same." "Pit cole" is also mentioned as occurring in Derbyshire, Leicestershire, and Staffordshire. Early in the 17th century pit or sea-coal was applied to the smelting of iron, and during the course of the century it came into general use in the arts and manufactories. The quantity raised must have been considerable, and the pits numerous and opened out to some extent. Although we have but little information about the men who worked in them, it may be inferred that they had already learned to face the dangers of working coal underground from the dreaded explosions or irruptions of water. These

records also furnish data estimating the importance of the coal trade in former times. Almost the earliest, and certainly the first lucid account of a colliery explosion, was that given by Mr. Roger Mostyn, in the year 1677, and published in the "Philosophical Transactions" of that year. The author obtained the description from his father's steward and overseer, at his coal works, at Mostyn, North Wales. He tells us that the above-mentioned work is "upon a cole five yards in thickness, and hath been begun upon about six or eight and thirty years ago. When it was first formed it was extreme full of water, so that it could not be wrought down to the bottom of the cole; but a witchet or cave was driven out in the middle of it, upon a level, for gaining room to work and drawing down the spring of water that lies in the coal to the eye of the pit; in driving of which witchet, after they had given a considerable way underground and were scanted of wind, the fire damp did by little and little begin to breed, and to appear in crevices and slits of the coal where water had lain before the opening of the coal, with a small bluish flame working and moving continually, but not out of its first *fiat*, unless the workmen came and held their candles to it, and then, being weak, the blaze of the candle would drive it, with a sudden fiz, away to another crevice, where it would soon after appear blazing and moving as formerly. This was the first knowledge of it in this work, which the workmen made sport of, and so partly neglected it till it had gotten some strength; and then, upon a morning the first collier that went down, going forward in the witchet with his candle in his hand, the damp presently darted out violently at his

candle that it struck the man clean down, singed all his hair and clothes, and disabled him from working hereafter. Some other small warnings it gave them, insomuch that they resolved to employ a man of purpose, that was more resolute than the rest, to go down a while before them every morning to chase it from place to place, and so weaken it. His usual manner was to put on the worst rags he had, and to wet them well with water, and as soon as he came in danger of it then he fell grovelling down on his belly, and went so forward, holding in one hand a long wind, or pole, at the end of whereof he tied candles burning, and reached by degrees towards it; then the damp would fly at them, and if it missed putting them out it would quench itself with a blast and leave an ill-scented smoke behind it."

In this description, the "man of purpose" presents the prototype of the present fireman, who, however, instead of a pole with a candle at the end of it, uses a safety lamp to discover the presence of firedamp.

The same author gives a quaint description of a subsequent explosion at the same colliery, which occurred on the 3rd of February, 1675, after a cessation of work for a few days. The damp on this occasion "flew to and fro over all the hollows of the work with a great wind and a continued fire, and, as it went, keeping a mighty great roaring noise on all sides." The men who happened to be underground at the time were singed "as if they had been whipped with rods; some, that had least shelter, were carried fifteen or sixteen yards from their first stations and beaten against the roof of the coal." Mr. Roger Mostyn further describes how the blast came up the pit with a noise that was

heard fifteen miles off, so that trees that were growing on the surface were felled, and the winding machinery blown to pieces. From this description of an accident it seems that this colliery, though not an extensive one according to modern ideas, must have been of some importance, and capable of raising a considerable quantity of coal. As a matter of fact, the Mostyn coal district was one of the earliest developed in Great Britain. Andrew Yarranton, writing about the needful improvements for the navigation of the River Dee, in 1677, refers to the then important colliery of Aston, in Flintshire; and it seems that at that time Ireland was almost entirely supplied with coal from the River Dee.

Among the other coal fields which were worked at an early date, we find also that of Staffordshire. This was due to the comparative shallow depth of the coal-beds, the most important of which—namely, the ten-yard seam—was worked over a considerable area, so close to the surface that it could be cut and removed like stone from a quarry. The abundance and cheapness of coal in Staffordshire first directed the mind of Dud Dudley to apply it to the smelting of iron in blast furnaces, and after its application to this purpose the development of the coal field increased with rapidity. The growth of the coal trade in the Midland counties is obscure, but Dr. Plot, in his "Natural History of the County of Stafford," published in 1686, gives many interesting details concerning the workings underground, and the dangers to be met with. He enters minutely into the various kinds of "damps" to be met with underground, which he sub-divides into "simple air alone cor-

rupted, smoak damp, peas-blossom damp, globe damp, and fulminating damp." The globe damp he ascribes to the exhalations of the men and the smoke of their candles, becoming "visible in the form and bigness of a foot-ball," which, when broken, disperses in fatal vapour, being "altogether mortal, though not so violent as the fulminating damp." He then refers to the great dangers of these fulminating damp, as shown by explosions which are recorded "to have happened not long since at Ash-berg-hills and at Wingersworth, within ten miles of Chesterfield, A.D. 1675, where the vapours taking fire at the candles of the workmen, they found themselves presently environed with flames; their faces, hands, hair, and clothes in great part being very much burnt, and one of them having his armes and legges broken, and the rest of his body strangely distorted; the now enflamed *damp* of one of them gowing forth of the mouth of the pit like a clap of *thunder*, shooting off the *turn* or *windless*, and shaking the very earth so much that a workman in another *Bink* hard by feared the roof would have fallen in upon him and buried him." Continuing this subject, Dr. Plot goes on to say how "the ingenious Mr. Beaumont tells us they have this sort of *damp*, too, in some *coal works* bordering upon the *Mendip Hills*, and that in the most easterly one of them they are so very frequent, that scarce a pit fails of them, many men of late years having been killed, many others lamed, and a multitude burnt. Many have been blown up at the works' mouth, and the *turn beam*, which hangs over the shaft, thrown off the frame by the force of it."

In concluding the subject of fulminating damp, he

makes the following observation, one which holds good to the present day: "And, therefore, the prudent collier that knows his work liable to these inconveniencies always minds the *wind*, which is the only way they have to avoid this sort of *damp*."

It is curious to note that whereas Mr. Mostyn describes a colliery explosion in Flintshire in 1677, and Dr. Plot one in the Midland counties in 1675, there exists no record of such an event in the north of England until the year 1705, in which year the author of a pamphlet, entitled the "Complete Collier," mentions a "blast" which occurred in October, 1705, killing above thirty persons; and the "Philosophical Transactions," for the year 1709, contains a description of an accident which occurred at Fat Field, near Chester-le-Street, by which sixty-nine persons were killed. The account of this accident is worth quoting, as the first explosion in the north of England authentically described. The accident was a very serious one, the number of deaths considerable, and the details more than usually horrifying. "Two men and a woman were blown quite up from the bottom of the shaft, fifty-seven fathoms deep, into the air a considerable distance from the mouth of the pit, one of the men with his head almost off, and the woman with her bowels hanging about her heels."

The blast in this fearful explosion is compared to the "loudest claps of thunder;" and the fish in a stream some distance off "were in great numbers taken up dead, floating in the water," and the engine used for raising coal blown to some distance.

The viewer of the colliery is described as one who "takes the best care to preserve a free communication

of air through all the works, but in a remote corner of the pit an accumulation of gas had existed during the hot and sultry season. After a change of weather, an overman "being induced, as is supposed, by a fresh, cool, frosty breeze of wind, which blew that unlucky morning, and which always clears the works of all sulphur, had gone too near the part, and had met the sulphur just as it was purging and dispersing itself, upon which the sulphur immediately took fire by his candle, and so he proved the occasion of the loss of himself and so many men, and of the greatest fire that ever was known in these parts."

After this brief mention of early coal mining, and the accidents which occurred in the pits, it may be interesting to consider the people who worked in them, and exposed their lives in doing so.

From the peculiarity of their occupation, and the generally remote districts where collieries were situated, the colliers led a life apart, until by degrees they actually looked on themselves as forming a race apart from their fellows. They were regarded by their neighbours as outcasts, and almost at war with society. Sir Thomas Smith, writing in 1589, and giving a long list of artizans and labourers, completely ignores the miners and colliers. In later days, when George Whitfield spoke of converting the Indians, many of his friends said to him: "What need of going abroad for this? If you have a mind to convert Indians, there are colliers enough in Kingswood."

This coal district, near Bristol, was then noted for the brutality and fierceness of its inhabitants. They are thus described in Southey's *Life of Wesley*: "It (Kingswood) was then (1739) inhabited by a race of

people as lawless as the foresters their forefathers, but far more brutal, and differing as much from the people of the surrounding country in dialect as in appearance." Whitfield went among the savages of Kingswood, and Southey remarks: "In truth it was a matter of duty and sound policy (which is always duty) that these people should not be left in a state of bestial ignorance—heathens, or worse than heathens—in the midst of a Christian country, and brutal as savages, in the vicinity of the second city of England."

About this time Wesley went among the colliers of the north, preaching and converting. Many of them, perhaps most of them, had never heard the gospel preached, and were really nothing but heathens. But they eagerly listened to the eloquent preacher, and he describes the "white gutters made by their tears, which plentifully ran down their black cheeks." But his estimate of their moral condition is sad enough. At Newcastle he "was surprised at so much drunkenness, cursing, and swearing, even from the mouths of little children." Then, again, speaking of a colliery village called Chawden, he says: "I found we were got into the very Kingswood of the north. Twenty or thirty wild children ran round us as soon as we came, staring as in amaze."

They could not properly be said to be either clothed or naked. "One of the largest girls, about fifteen, had a piece of a ragged dirty blanket some way hung about her, and a kind of cap on her head of the same cloth and colour." The colliers in the other districts were no better, and those of Staffordshire were long noted for bull baiting and other kindred sports.

Such observation coming from keen and honest observers like Whitfield and Wesley, shew only too clearly how neglected, wretched, and degraded our mining population was during the last century. To use the ever-true words of "The Vindication of Natural Society," published under the name of Lord Bolingbroke, in 1756: "These unhappy wretches scarce ever see the light of the sun; they are buried in the bowels of the earth, where they work at a severe and dismal task, without the least prospect of being delivered from it. They subsist upon the coarsest and worst of fare. They have their health miserably impaired, and their lives cut short by being perpetually confined in the close vapours of these malignant minerals."

Yet at the accession of George the II., a quarter of a century earlier, the coal trade was so prosperous that the House of Commons, in order to meet the expenditure of the year, borrowed £1,750,000 from the Bank of England, for which annuities to the extent of £70,000 were granted, to be raised on coal imported into the City of London. The coal trade had from the earliest times been a source whence extraordinary revenues were raised—either for the personal use of the sovereign, the benefit of the estate, or the advantage of the metropolis. The busy swarm of subterranean workers did not, however, for centuries attract one gleam of royal favour, or receive the smallest consideration from the legislature of the country. On the contrary, the early legislation with regard to colliers was of an oppressive character, at least, in the sister kingdom. As far back as the year 1606, the Scotch Parliament passed an Act by which all



"coilzearis, salteris, and coilberaris" were prohibited from leaving their employment without a written attestation from the masters they served, under pain of punishment in their bodies, and ordering that any person employing them, on being challenged by their rightful masters, shall return them within twenty-four hours, or pay a fine of one hundred pounds Scots. This Act virtually made slaves of the colliers. Subsequently, in 1661, this Act was ratified and fresh clauses inserted, extending its provisions to the "lavers and drawers of water at the cast heugh head and gatesmen who work the wayes and passages." So that not only the coal hewers proper, but the entire working staff of the collieries, came under the Act. Some insight into the manners and customs of the Scotch colliers at that time can be gleaned from the concluding paragraph of the Act of 1661, which recites that, "because the said coal hewers, and salters, and other workmen in coal heughs within the kingdom do ly from their work at Pasch, Yule, Whit Sunday, and certane other times in the year, which times they employ in drinking and debaushire, *to the great offence of God and prejudice of their master*, it is therefore statute and ordained that the said coal hewers, and salters, and other workmen in coal heughs of this kingdom, work all the sex dayes of the week, except the time of Christmasse, under paine of twentie shillings Scots, to be paid to their masters for ilk dayes failzie, and other punishment of their bodies." From this it appears that the collier or "coilzier" of 1661 was inclined to "play" as frequently as opportunity presented itself, —a peculiarity which his descendant of the present day has inherited.

The colliers in Scotland, like their brethren in England, were looked down on with contempt, and Sir Walter Scott refers to them as "colliers, salters, and other *adscripti glebæ*, or slaves of the soil." When the Act of the Scottish Parliament "for preventing wrong imprisonment, and against delays in tryals," known as the "Scotch Habeas Corpus Act," was passed in 1701, it was provided that the "Act is in no wayes to be extended to colliers or salters." They were debarred from the reasonable rights extended to the rest of the population.

The Scotch colliers were allowed to remain in this state of bondage until the year 1775, when the British Parliament passed an Act by which all persons not then in actual employment at collieries, but who should thereafter become so, were to be treated as free labourers. This Act was not, however, prompted by humanitarian sentiments, but because, as the preamble recites, "there are not a sufficient number of colliers, coal bearers, and salters in Scotland for working the quantity of coal and salt necessarily wanted, and many new discovered coals remain unwrought; nor are there a sufficient number of salters for the salt works, to the great loss of the owners and disadvantage to the public." It was proposed in the Bill, as presented to Parliament, to liberate all persons working as colliers, &c., but an amendment was carried by which the clause provided that "no person who shall begin to work" shall be bound in any other way than by the law of Scotland as regarding servants and labourers. This Act gave these latter the benefit of the Scotch Habeas Corpus Act, from which the others were debarred. The complete emancipation

of the Scotch colliers was not effected until the year 1799, when the Act 39 George III., cap. 56, was passed.

This Act, like the one previously passed in 1757, was prompted, not by the advisability of freeing the bondsmen, but simply because it was found impossible to keep the colliers strictly in servitude, and difficult to obtain labour for the pits. It was found that the colliers worked only three or four days in the week instead of six; that they were induced to break the law and leave their employers by the temptation of higher wages; and lastly, that they frequently enlisted in His Majesty's army and navy.

The Act provided that all colliers bound at the date of passing the Act should be free; that the justices of the peace for each county should fix the rate of wages for each year; that coal owners were to have the right to reserve a part of the men's wages, not exceeding one-twelfth, to cover advances; and lastly, that combinations among men were to be punished by fines.

The liberated colliers did not at first appreciate their new rights, nor did they derive much benefit from the change. Accustomed to look to their masters, or rather owners, for maintenance when disabled by age or accident, they dreaded to encounter the difficulties incident to their new condition, nor had they acquired those prudent habits necessary for their own protection. Speaking of them after emancipation, Sir Walter Scott remarks: "They were so far from desiring or prizing the blessing conferred on them, that they esteemed the interest taken in their freedom to be a mere device on the part of the proprietors to get rid of what they called head and harigald money,

payable to them when a female of their number by bearing a child made addition to the live stock of their master's property."

The Statute Book of England contains no enactments concerning collieries and their work-people in England until comparatively recent times. There is no allusion to the subject in the Statute Book until the year 1736, when, in "An Act relating to persons doing injury and violence to His Majesty's subjects," the following clause appears: "And be it further enacted, by the authority aforesaid, that from and after the twenty-fourth day of June, One thousand seven hundred and thirty-seven, and during the continuance of the before-mentioned Act of the ninth year of the reign of His late Majesty King George I., if any person or persons shall wilfully and maliciously set on fire, or cause to be set on fire, any mine, pit, or delph of coal, or cannel coal, every person so offending, being thereby lawfully convicted, shall be adjudged guilty of felony, and shall suffer death, as in cases of felony, without benefit of clergy." From this stringent clause it may be inferred that such occurrences as the wilful setting on fire of coal mines were sufficiently numerous to warrant legislative enactment. There are on record many cases of wilfully firing of collieries; a notable one occurred in the latter part of the year 1765. It happened that in that year a dispute arose between the workmen and owners of some collieries in the north of England about the terms of binding the men. It was then usual for the colliers in the North to engage or bind themselves to the masters for a certain term, generally fixed at one year. The binding usually took place in the month

of August, but the men complained that "the honourable gentlemen in the coal trade will not let them be free till the 11th of November of the ensuing year, which, instead of eleven months and twenty-five days, is upwards of fourteen months, so the said pitmen are resolved not to work for or serve the said gentlemen in any of the collieries till they be fully satisfied that the said article is dissolved and new bonds and agreements entered into for the year ensuing." This dissatisfaction led to a strike of several weeks' duration, and it was during this strike that, on the 18th September, early in the morning, the mines of coal and one of the pits of Pelton Colliery, in the county of Durham, belonging to Mr. Jamieson and partners, were wilfully and maliciously set on fire. This was not an isolated case, for the pitmen of the Tyne and Wear at that time burnt the fittings and tools of many coal pits, and set fire to the coals both above and below ground. The pitmen, however, of Hartley Colliery having been "civilly" treated by the owner, Thomas Delaval, Esq., continued peacefully at their work in the midst of the general surrounding insurrection. These rough and desperate colliers shewed themselves amenable, if not to reason, at least to civility—a commodity which at that time they were not in a position to expect much of.

The next legislative enactment at all concerning colliers, was the "Masters and Servants Act," passed in 1747, wherein, among other artificers and handicraftsmen, "miners, colliers, keelmen, pitmen," are specially and severally mentioned. In 1769 a new "Malicious Injuries Act" was passed, and among other offences included that of "destroying or damaging

of engines for draining collieries and mines, or bridges, waggon ways, or other things used in the conveyance of coals and other minerals." It was especially set forth in the clause that "any person or persons who shall wilfully or maliciously set fire to, or burn, demolish, pull down, or otherwise destroy or damage any fire-engine erected, or to be erected, for draining water from collieries or coal mines, or for drawing coals out of the same, or any bridge, waggon way, or track erected, or to be erected, for conveying coals from any colliery or coal mine or staith for depositing the same; every such person being lawfully convicted of any or either of the said several offences, or of causing or procuring the same to be done, shall be adjudged guilty of felony, and shall be subject to the like pains and penalties as in cases of felony; and the court before whom such person shall be tried shall have power and authority to transport such felon for the term of seven years, in like manner as other felons are directed to be transported by the law and statutes of this realm." These several Acts show the feeling of apprehension which then existed of the lawless and dangerous character of the colliery population.

This feeling even pervaded the Act 39 and 40 George II., cap. 77, passed in July, 1800, "For the security of collieries and mines, and for the better regulation of colliers and miners." This Act was especially intended for the protection of the colliery proprietors. The first clause provides that any one filling up an airway, or damaging any part of a mine or roadway leading to it, or digging minerals from any waste, is guilty of felony, and is to be transported for

seven years. The third clause determines that any person not working in accordance with his agreement, or contrary to the directions of the owners, shall forfeit forty shillings and may be imprisoned for non-payment. The fourth clause relates that "great frauds are practised in the working and stacking of such coal, ironstone, and iron ore, by which colliers and miners obtain money beyond what they earn or are able to repay;" and provides that any person stacking coal or minerals in a fraudulent manner may be imprisoned. The fifth clause relates to punishment for theft; the sixth to the division of sums forfeited betwixt the informers and the parish; and by the seventh the evidence of the inhabitants of the locality is made admissible at law.

This one-sided measure was the first legislative enactment dealing with the labours of colliers in England, and the only one bearing on the underground workings until the year 1842, when Lord Shaftesbury, then Lord Ashley, introduced his measure prohibiting the employment of women and young children underground.

About the beginning of the century, and shortly after passing the stringent Act of 1800, the condition of the operatives in factories and spinning mills began to attract much attention. Rumours of the terrible sufferings which these poor people had to undergo became audible, and a feeling that they were not treated as they ought to be in a free and Christian country permeated the public mind. Inquiries into the subject led to shocking and sad disclosures, and Members of Parliament, as well as other public men, interested themselves in the cause of this suffering class.

Among them the elder Sir Robert Peel stood forth preëminently, by his endeavours to frame a measure with the object of securing a permanent improvement in the condition of these workpeople. What is known as the Factory movement now commenced, and led to a series of Acts referring to the operatives. The Act known as the "Morals and Health Act" was passed in 1802, and was the precursor of many other measures for the benefit of the mill and factory population. The colliers did not participate in the advantages thus accorded to the operatives, and their claims for Parliamentary attention were, for a time, quite overlooked.

These brief notices of the condition of the colliers, and the scarcity of legislation affecting them up to the commencement of the present century, may serve as an introduction. In the following pages the development of the coal trade, and the consequent increasing dangers of working, will be noticed, as well as the social changes among the working colliers. The necessity for some legislation became apparent as the works extended in size and the number of people employed increased, and a series of measures were passed for the regulation and inspection of collieries, the consideration of which will form the subject of the subsequent chapters.

CHAPTER II.

DEVELOPMENT OF THE COAL TRADE—FORMATION OF THE SUNDERLAND ASSOCIATION—INVENTION OF THE SAFETY LAMP—CONDITION OF THE COLLIERS IN 1833—THE SELECT COMMITTEE OF 1835—THE ROYAL COMMISSION ON THE EMPLOYMENT OF WOMEN AND CHILDREN.

THE development of the coal trade was somewhat impeded in the commencement of this century by the stagnation of all commerce, caused by the great war and the European blockade. The peace of 1815 was followed by a period of great distress, and in many of the manufacturing districts the reduction of wages resulted in strikes and riots; among others the colliers were discontented with their small earnings and short work. In Newcastle riots of some importance occurred in 1816. In the same year the colliers from the neighbourhood of Bilston, in South Staffordshire, wandered about the country, dragging cartloads of coal, with the object of soliciting the assistance of the benevolent in the villages and towns they passed through. Several parties directed their steps towards the metropolis, with the vain idea that if they laid their case before the Prince Regent he would order them employment. One party, consisting of forty-one men, dragging a waggon loaded with upwards of two tons of coal, were stopped, on approaching Maidenhead, by the magistrates of the town, who explained the illegality of the step they had taken. The men behaved with great propriety, gave up their coals at once, and were quite satisfied with the present which they received. They, however, refused to return to their

homes unless the mayor signed a statement to the effect that they had behaved themselves properly. Another similar procession was stopped near St. Albans, by Sir N. Conant, who had been dispatched to intercept them, and they also readily gave up their coals and returned home. A similar band of colliers was stopped at Chester, on their way to Liverpool, by the magistrates of that city, to whom they shewed every respect and deference, and on receiving £20 gave up their coals, and returned peaceably to their parishes. The incidents thus recorded are memorable, for they show how real the distress was among the colliery operatives, and how anxious some of them, at least, were to work for their bread. This state of depression did not last long; and when the trade of the country revived the colliers had their full share of the general prosperity. Circumstances assisted the rise of the coal trade at this time. The system of canals, already largely introduced at the end of the eighteenth century, was greatly extended during the commencement of the present, and the numerous water-ways which had been, and were in progress of being constructed, had a most beneficial effect on the development of the coal fields.

Coal now found its way into districts where previously it had been almost unknown, and could be delivered to the manufacturer at prices hitherto impossible. Moreover, new applications of steam machinery were being adopted for many purposes, and among others for the important one of navigation. The first steamboat plied on the River Clyde in 1811, and a few years later a packet was put on the Thames where steam communication was established, in 1815,

between London and Gravesend. This rapid development of the coal trade took place without any legislative enactments of importance, excepting an act of justice which was rendered to the colliers in 1817, when the Act of 57 George III., cap. 122, ordered that labourers working in collieries should receive "every part of their wages in good and lawful money," a provision which other labourers had already enjoyed for nearly a century. In 1827, the laws relating to malicious injuries to property were amended and consolidated, and the penalties for setting fire to coal mines, or drowning them out, or otherwise injuring the mines (or any part of them), or the machinery connected with them, were confirmed; and a few years later, namely, in 1831, an Act amending the law relating to payment of wages, commonly known as the Truck Act, was passed.

During this period the coal fields had become considerably opened out, so much so that the output for the United Kingdom, which had been computed at ten millions of tons in the year 1800, had reached fifteen millions in 1816. The collieries had increased both in number and in depth and extent of workings, with a proportionate augmentation of men employed. With this extension of operations the dangers and risks of working were multiplied. Accidents of a very serious character became more frequent, and the country was startled from time to time with the news of some tremendous explosion, by which a number of lives were lost.

In those days of slow communication and scanty knowledge of current events, only the more disastrous catastrophes found their way to public notice. Men

were crushed, or suffocated, or drowned, or otherwise killed in pits, and buried without inquiry or record, as it was not customary in those days to hold inquests on the victims of colliery accidents. But the accidents entailing large loss of life forced themselves on publicity. Among others in 1805, two serious explosions occurred, one at Hebburn Colliery, by which thirty-five lives were lost, another at Oxclose Colliery, where thirty-eight men were killed. A terrible explosion occurred at the Felling Colliery in 1812, by which ninety-two lives were sacrificed. This accident made such an impression in the districts that a society was formed at Sunderland, in the following year, under influential patronage, with the purpose of inquiring into the causes of such calamities and devising means for preventing them. This association, though short lived, was instrumental in bringing about very important events in the history of coal mining. A public meeting, inaugurating the association, was held on the 1st October, 1813, under the Presidency of Sir Ralph Millbanke, and a committee appointed to carry out the objects of the society. One of the first acts of this committee was to represent to the magistrates the neglect of townships and parishes in not calling on coroners to hold inquests on the bodies of those killed through accidents in coal mines. In consequence of these representations the matter received attention at Quarter Sessions, and Sir John Bayley at the Newcastle Assizes, in 1814, in his charge referred to the subject. The system of stifling all inquiry into the subject of accidents in coal-pits had been always pursued by colliery owners, who either disliked or dreaded inquiry into the details of their

management; but from this time on we find inquests held, if not in all cases, at least very frequently, on the victims of colliery accidents. In November, 1813, the Sunderland Association published its first report. It contained a letter from Mr. Buddle, then the leading viewer in the north of England, giving a succinct description of the modes of ventilating and working collieries adopted by him. The letter is interesting as shewing the condition of collieries before the introduction of the safety lamp. Mr. Buddle states that "the only method we are at present acquainted with for the prevention of accidents by fire is thorough ventilation of the several passages and workings of the mine." He then proceeds to describe the mechanical means employed to produce the necessary current, from which it appears that since that date (1813), however much we may have improved on the apparatus he used, we have not discovered one new in principle. He describes the furnace, the waterfall, the steam-ventilator, the air-pump, and the heated air-pipe or cylinder. His air-pump, or mechanical ventilator, was of rather primitive construction, and capable of drawing up about 8000 cubic feet of air per minute. Referring to this apparatus, he makes the following observations, confirmed by the experience of years since then:—"It is worthy of remark that, in the event of the air-pump being accidentally stopped, the current of air will continue a considerable time from the momentum acquired by the action of the pump." He then minutely describes his methods of dealing with currents of air underground, so as to bring fresh air always to the face of work. The blowers of gas

were in his time, as they are now, one of the greatest sources of danger. Mr. Buddle describes his method of sweeping away the gas by means of doors and brattices, "by which the current of atmospheric air plays upon the mouth of the blower, and continually dilutes and sweeps away its foul eructations."

Referring to the lives lost in explosions, he records his opinion, after witnessing many explosions, that only one-fourth of the deaths are caused by the fire, the remainder being attributable to the after damp. In order to save as many lives as possible in case of explosion, he dwells on the importance of constructing all the main stoppings of stone walling, sufficiently strong to resist the shock of an explosion, and cites an accident at Percy Main Colliery, where twenty-three men were burnt, but not one life lost through after damp, owing to the adoption of this plan, by which the main current of air is preserved through the mine. The importance of preserving a ventilating current after an explosion led him to invent the swing door, a contrivance which may have served its purpose in cases of slight explosion, but which cannot withstand the effects of a powerful blast. He next gives a graphic description of trying the "low" or lighted candle in a dangerous atmosphere. At that time the only apparatus by which light could be produced with comparative safety in a dangerous atmosphere was the steel mill.

The mill, in practical hands, was sufficiently safe, as the sparks changed in appearance and colour according to the percentage of inflammable gas present in the air. In describing the instrument, Mr. Buddle says: "In approaching the firing point with steel mills they

grow still more luminous, and assume a kind of liquid appearance, nearly resembling the spark arising under the hammer from iron at welding heat." And referring to the change of colour, he further states that "when the inflammable air predominates in the circulating current the sparks from the steel mill are of a blood-red colour, and as the mixture increases the mill totally ceases to elicit sparks." Since the days of Buddle the system of working coal has been greatly changed, chiefly as a consequence of the greater extent of underground workings and larger output of collieries. Not only have mechanical appliances become more general and machinery more powerful, but ventilating currents have been increased to an extent not dreamed of in former days. Buddle tells us that "the standard air course, or current of atmospheric air, which I employ in the ventilation of the collieries under my care abounding in inflammable gas, moves through an aperture from thirty to forty feet in area, with a velocity of three feet per second, which equals 5400 to 7200 cubic feet, or from 525 to 700 hogsheads per minute." This he considered sufficient for all practical purposes; and, moreover, gives it as his deliberate opinion that any "further application of mechanical agency towards preventing explosions in coal mines would be ineffectual:" he depended more on the discovery of some method by which explosive carburetted hydrogen would be chemically changed and rendered harmless. In order to obtain an effectual remedy he thought that men of science ought to be resorted to. In concluding his letter, Mr. Buddle remarks that "on an average through this district I believe that the ordinary and unavoidable casualties in collieries

occasion more calamity than explosions of inflammable air." This observation, true in the days of Buddle, remains so at the present time, and more lives are sacrificed per annum by the sundry casualties of underground working than by the more startling explosions. The Sunderland Society continued to agitate and collect information. They determined to apply to Sir Humphrey Davy, in order to obtain his opinion as to the best means of preventing colliery explosions, and Dr. Gray, a member of the committee, was commissioned to communicate with him. The result of this correspondence was a visit of Sir Humphrey Davy to the north of England in the autumn of the year 1815.

The direct result of this visit was the invention of the safety lamp, known as the "Davy," and since its introduction in constant and very general use in fiery collieries. The idea of applying light underground in such a manner as not to cause the inflammable air to explode was not new. As far back as 1760 the steel mill was invented by Mr. Spedding, which consisted of a small steel wheel, made to revolve in contact with flints in such a manner as to cause a rapid succession of sparks. It was by no means a perfect instrument, and moreover required always one person, and sometimes two, to keep the wheel revolving so as to produce a constant though feeble light. In 1796 a safety lamp is recorded as having been invented by Humbolt. The first lamp applied underground was that invented by Dr. Clanny, in 1813, and described in the "Philosophical Transactions" of that year. This instrument was too complicated and cumbrous for practical use, and it remained for Sir

Humphrey Davy to invent a lamp which would be a safeguard against damp, and at the same time simple in construction. Before Sir Humphrey brought his invention to maturity, a lamp on somewhat similar principles had been constructed and tried by George Stephenson, then colliery engineer at Killingworth. The lamps differed in so far that whereas Sir Humphrey based the security of his lamp on the theory that flame would not pour through small apertures, such as the meshes of wire gauze, Stephenson thought that, by encircling the flame with a glass tube, the rush of the burnt air upwards would prevent the fire damp from igniting. When this lamp was tried at Killingworth Colliery, in October, 1815, in an explosive atmosphere, no explosion occurred, but the light was put out. Repeated experiments gave the same results; and it appeared as if the burning of the carburetted hydrogen in the lamp produced so much carbonic acid and oxide of carbon, or after damp, that the light would no longer burn. This lamp was subsequently improved in construction, and it is now one of the best and safest in use. Very shortly after the invention of safety lamps they came into general use in the fiery collieries in the North of England, and it was thought that explosions might be considered as things of the past. The conclusion, however, proved to be hasty and erroneous. Accident followed accident; and thirteen years after the introduction of safety lamps, Mr. Buddle, in giving evidence before a committee of the House of Lords in 1829, said that a greater loss of life had taken place since the introduction of lamps than during a corresponding period previously. This he attributed to the greater depth of

the mines, their larger extent, and to the fact of pillars being worked, which could not have been done without the safety lamp. To this committee Mr. Buddle also stated that, in one of the collieries of which he was the viewer, the quantity of air he considered needful was no less than 18,000 cubic feet per minute. Yet only about fifteen years previously he had given it as his opinion that the utmost limit of mechanical ventilation had been obtained with a ventilating current of only 7,000 cubic feet per minute. While Mr. Buddle was giving evidence before committees of both Houses in 1829 and 1830, on the risk of collieries as an investment and their danger to life, the condition of the mining population was being brought to light through the report of the Commissioners entrusted with carrying out the provisions of the "Factory Act," passed in 1833. Mr. Carleton Tufnell, when visiting Lancashire in the course of his enquiries, incidentally turned his attention to the colliery population of the district, and in his report for the year 1833 recorded the results of his enquiries. The evidence of the witnesses he examined shewed that persons working in coal mines were exposed to extreme hardships. The number of hours during which these people were confined in narrow spaces, and the vitiated air they had to breathe, produced deformity, and disease, and premature death. The picture, as drawn by the witnesses, was painful and revolting. Children were sent down with no more provision than a bit of bread and cheese, and this they sometimes could not eat, owing to the dust and badness of the air. The heat was at times so great as to melt candles, and many of the roads were covered with water.

The children were frequently beaten by the men for whom they worked ; so much so, that "they seldom slept with a whole skin." Besides this, their backs were cut with knocking against the roof and sides of the roadways, and their feet and legs covered with sores and gatherings owing to the water. The children, boys and girls, earned their wages by drawing the coals in tubs along the galleries by means of a belt and a chain passing between the legs. Many girls were thus employed, and after a time they became crooked and deformed. From the nature of the occupation, they soon became as rough and uncouth as the men and boys, fighting and swearing like them, and many bastards were born in the colliery villages. Explosions, of more or less consequence, occurred frequently, and many of the men were maimed. At the age of fifty they were unfit for work, and after that they had to live in misery or go to the parish. Mr. Tufnell visited the underground workings of one colliery, and expresses his opinion of them in the following words:—"I cannot much err in coming to the conclusion, both from what I saw and the evidence of the witnesses given on oath, that it must appear to every impartial judge of the occupation, that the hardest labour in the worst room in the worst conducted factory is less hard, less cruel, and less demoralising than the best of coal mines." This was written in 1833 ; and allowing for some exaggeration on the part of the commissioner, unaccustomed to mining operations, and perhaps reporting on some exceptional case, there is every reason for accepting the description of the state of the collieries as, unfortunately, only too near the truth. Although in this, and

some other reports made at that time, the condition of the mining population was alluded to, nearly ten years elapsed before any move was made to alter so grievous a state of things. The dangers, however, of colliery workings were kept before the public mind by the fearful explosions which occurred from time to time; and the subject at last came before the attention of the House of Commons in 1835, when a Select Committee was appointed, on the motion of Mr. Pease, member for South Durham, on the 2nd of June, and which reported to the House at the end of the Session. Although the committee, after hearing a great deal of evidence from competent witnesses, did not make any recommendations as to legislation, the report is worthy of attention, and the minutes of evidence are valuable and interesting. Almost the first sentence of the report admits that the committee "failed in obtaining accurate information as to the number of lives lost." Returns had been asked for from the different coal districts; but they proved defective, and many counties did not furnish any.

The number of deaths thus approximately estimated for the twenty-five years preceding 1835 amounted to 954, and to 1600 since the year 1710, figures palpably below the real numbers. The committee point out that the deaths recorded during eighteen years previous to the introduction of safety lamps number 447; whereas, during the same period subsequent to that event, 538 persons perished. This increase is accounted for by the larger out-put of coal, the consequent greater extent of the underground workings, and also to the opening of fresh and more fiery seams. During the sitting of the committee a terrible explo-

sion occurred at the Wallsend colliery, by which 102 men and boys were lost, and they called for a copy of the evidence taken by the coroner to assist them in their enquiries as to the cause of the accidents. After enumerating the more palpable causes of accidents, such as explosions of inflammable air, choke damp, and other noxious gases, or inundations of water, they remark that "there still remains a long list of casualties, some of which are wholly beyond human control, inseparable from mining pursuits, and their fatal results are often justly attributed to the ignorance or wanton neglect of ordinary caution, and a recklessness of danger in defiance of common discretion." They divided their subjects for inquiries under the following heads: ventilation, safety lamps, and maps and plans.

Referring to ventilation, they considered that "the practice of placing wooden partitions, or brattices, in the ventilating shafts is deservedly reprobated," and remark on the importance of a sufficient number of downcast and upcast shafts. They acknowledge the great service rendered by the safety lamps invented by Sir Humphrey Davy, at the same time admitting that its principles had been previously known to Dr. Clanny and Mr. George Stephenson. They investigated the contingencies under which the lamp is not safe, and, as to this subject, "they regret that the cautions he gave to some of his immediate friends were not made more public." They then point out that the prejudices entertained against the lamp in some districts were not occasioned by doubts as to its safety, but by the diminished light it gave. They conclude by saying that "in some mines, now lighted

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by the ordinary means, the use of the lamp ought, in the judgment of your committee, to be compelled by the owners." For the purpose of investigating the subject of safety lamps, the committee adjourned to the laboratory of the London University, where they had every known lamp tested. They found that explosions of gas took place within every lamp, except that of Messrs. Upton and Roberts. In concluding the report, the committee come to consider "how far legislative enactments might come fairly in aid of the miners," and on this important point they say: "The great dissimilarity of the mineral stratification of the kingdom, the constantly varying circumstances of particular mines, render it, in their opinion, impossible at present to lay down any precise direction, or to form any rule of universal application. Your committee agree with many intelligent witnesses that great benefit might be fairly and sanguinely anticipated from men of known ability being encouraged to visit the mines, whether in the character of distinguished chemists, mechanists, or philanthropists." They did not, however, even suggest, much less advise, any organised system of Government inspection, and were content to note that many serious objections had been taken to such a plan by witnesses. They regretted, in conclusion, that they were not able to lay before the House any special plan or offer any decisive recommendations; but "they anticipate great advantages to the public and to humanity from the circulation of the mass of valuable evidence they have collected." In this, however, the committee were disappointed, inasmuch as the circulation of their report was a very limited one indeed, and the Blue Book which con-

tained it with the evidence, numbering 140 pages, was soon consigned to the shelves of the various libraries, where it remained, rarely consulted and almost unnoticed. 1835

Colliery explosions continued to occur at frequent intervals. During the year 1837, among other minor accidents, one occurred at Springwell Colliery, by which thirty men were killed; another at Wallsend, killing eleven men; and in the following year a still more serious explosion occurred at the St. Hilda Colliery, near South Shields, by which fifty-one lives were lost. Soon after this calamitous occurrence, and in consequence thereof, in August, 1839, a number of South Shields gentlemen formed themselves into a committee to investigate the cause of accidents in coal mines. This committee continued its labours for three years, and eventually published a report in the year 1842. The enquiry was specially directed to the study of the different safety lamps in use; the various systems of ventilation; the employment of boys underground; plans and sections; scientific education of officers of mines; Government inspection; and medical treatment after explosion.

A more exhaustive and complete investigation could scarcely have been made, and to the report of the South Shields committee is due the merit of first exposing, in a clear and comprehensive manner, some of the causes of the accidents in coal mines, and also of making many valuable suggestions for their prevention.

Referring to the employment of women and children underground, they "hope that the Legislature will at an early day be induced to pass an Act

to remedy the state of things, by restricting the employment of boys till a more advanced age, and for a more limited time each day, and preventing women and girls altogether from descending mines." This suggestion was carried out, very soon after the publication of the report, by the Act passed in 1842. The official registration of plans is also strongly recommended; and referring to Government inspection of mines, which at that time was only beginning to be mooted, they remark that "it is surprising that the coal mines of Great Britain, so vital to her strength and prosperity, should be left entirely to the unassisted efforts of individuals, without organisation, or even supervision of the State." They then strongly recommended a proper Government inspection, pointing out that the principle had already been applied to "railways, the professions, the manufactories, and some of the trades;" and further, that this practice had been adopted on the continent for a long time, and had been "productive of great advantage."

The opinion that some sort of Government supervision or inspection was necessary, or at least advisable, in order to reduce the loss of life in collieries, was daily gaining ground. Those conversant with colliery workings argued that a periodical inspection of coal mines by competent persons would lead to emulation among managers, and thus to improved management; and the general public, believing that all these terrible accidents occurred through neglect on the part of the owners, considered that they ought to be placed under official supervision. In fact, the condition of the people employed in the collieries, as well as the dangerous state of the mines themselves, which was being

gradually but forcibly brought to light, quite warranted the opinion that some manner of inspection ought to be organised. The report of the Inspector of Schools, under the Committee of the Council of Education for 1840, gave a very sad picture of the state of things in the coal districts of South Wales. Referring to children, more especially, he found that boys were sent underground at the early age of eight or nine, and never learned anything beyond their trade. A mother told him, in speaking of her young boys who worked in the mine, that "after they once went there they turned stupid and behind-like, and would not learn anything, and did not know what was right; and now, like the rest, they went to the public-houses like men."

The inspector (Mr. Tremenheere) gave much attention to the manner of life these colliers led. He found that they commenced a career of independence as boys, prematurely becoming men—and dissolute men; and he attributed much of the profligacy and recklessness which characterised their after life to their too early emancipation from parental control. Not only boys, but girls, were thus left to their own devices at tender ages, without any chance even of acquiring the rudiments of knowledge, or the first lessons of virtue and modesty. This unthinking and ignorant population were frequently the victims of avaricious coal owners, who evaded the Truck Acts directly or indirectly, often paying the men at or near special public-houses, where a large portion of their wages was certain to remain. But this was a time when the working population was receiving a large share of legislation and public attention. A Factory

Act had been introduced into the House of Commons in 1839 by the then Government, but withdrawn at the instance of Lord Ashley, who was then the champion of the working-man in the House of Commons. In the following year he moved for a Royal Commission in the following terms:—"That an humble address be presented to Her Majesty, praying that Her Majesty will be graciously pleased to direct an inquiry to be made into the employment of the children of the poorer classes in mines and collieries, and in the various branches of trade and manufacture in which numbers of children work together, not being included in the provisions of the Act for regulating the employment of children and young persons in mills and factories; and to collect information as to the age at which they are employed, the number of hours they are engaged in work, the time allowed each day for meals, and as to the effects of such employment, both with regard to their morals and their bodily health."

This commission was at once agreed to and the commissioners appointed. After a most painstaking enquiry, which lasted two years, they presented a report, which was published, and at once obtained a wide-spread notoriety, and has been, perhaps, more extensively read and quoted than any other Parliamentary document on the subject of mines and collieries.

The reports of the commissioners for the various districts revealed the deplorable condition of the mining population. It was almost incredible that such sufferings could possibly be allowed in a civilized country. The reports on the factory population had

already prepared the public mind for further revelations, but those now presented surpassed the most dismal surmises.

In reviewing the results of this enquiry, that which perhaps shocks the reader most is the treatment of young children.

Even infants of three or four years of age were frequently taken down the pits, the colliers themselves admitting that such was the case. One collier stated that he took his child, only three years of age, underground with him, and "it was made to follow him into the workings, there hold a candle, and when exhausted with fatigue was cradled upon the coals until his return home at night." These cases were indeed exceptional, but a general rule prevailed of sending children down at the age of seven or eight years.

This system of infantile labour, though general, did not meet with the approval of the colliers themselves, who, in giving evidence before the commissioners, complained of it, saying that "the sooner they go (down) the sooner their constitutions are smashed up." The effect of such work on children of tender age is self-evident. It was ruinous alike to health and morality. Their constitutions were "smashed up," as the colliers said, at an early age, their backs bent, their muscles irregularly and abnormally developed, and their tempers warped. So rapid was the demoralisation, that a Sunday-school teacher lamented that children of amiable temper and good conduct, at the age of seven, returned from working a few months at the collieries "with hellish dispositions."

The evidence respecting children was mostly col-

lected from the parents and the children themselves. The owners, or their representatives, rarely admitted that children under eight or nine years of age were employed underground. The owners, in general, were ignorant of the facts; and the overseers, men usually selected from among the working colliers, were too hardened and too much used to the prevailing system to appreciate the extent of the evil it produced. The employment of women and girls underground was no less disgraceful. This abominable custom was, however, not general in all the coal districts. In the north of England the practice had ceased since the year 1780, and in the thick coal seams of South Staffordshire it had never existed.

But in Scotland, in some parts of Yorkshire, and in South Wales, women were habitually employed underground. In Yorkshire they worked like men, performing every description of labour, from hewing the coal to dragging the tubs along the ways. In most districts women only performed the latter labour, that is, they "hurried" the empty tubs from the pit bottom to the face of coal and returned with them loaded. This labour was extremely arduous, and had to be performed under circumstances especially unfitted for females. To quote the words of the report: "They were dressed as boys, in trousers, crawling on all fours, with belts round their waists and chains passing between their legs."

Referring to this labour, one of the commissioners says: "When the nature of the horrible labour is taken into consideration, its extreme severity, its regular duration of from twelve to fourteen hours daily, the damp-heated and unwholesome atmosphere

of a coal mine, and the tender age and sex of the workers, a picture is presented of deadly physical oppression and systematic slavery, of which I conscientiously believe no one unacquainted with such facts would credit the existence in the British dominions." In Scotland, women were perhaps even more exposed to the hardships of underground work than in England. Not only had the women in Scotland to drag the coal tubs along the passages of the mine, but in many instances they had actually to carry it to the surface up ladders. The load in this case was borne by means of tugs passing over the forehead of the women, and when these happened to break the coals fell down the pit, to the great danger of those who were below. In the words of one of the witnesses, it "was not uncommon for women to loose their burden and drop off the ladder down the dyke below."

It is not surprising that one witness, a girl seventeen years of age, who had worked at harvesting for three seasons, said "that the hardest daylight work is infinitely superior to the best coal work." In fact, the evidence given by the women to the commissioners—in some cases revolting, in general painful—shewed that the conditions of life of these poor creatures were productive of the most shocking results, subversive of all morality, and almost unsexing the wretched victims of the system. The following extracts are culled from the voluminous evidence collected by the commissioners:—One witness says: "I think it scarcely possible for girls to remain modest who are in the pits regularly, mixing with such company as they do. Many of the wives who come from

the pits know nothing of sewing or any household duty such as women ought to know." The colliers themselves mostly disapproved of the employment of women underground, and in their evidence they consider it "a shameful practice. They are exposed to bad things when they are in the pits. They can see nought but blackguardism and debauchery," and so on. In fact, about that time, at a meeting of over 300 colliers, at Barnsley, a resolution was passed to the effect "that the employment of girls is highly injurious to their morals; that it is not proper work for females; and that it is a scandalous practice." The evil results of the system were most severely felt by the colliers, whose wives and daughters worked at the pits. Their homes were squalid through the neglect of all household duties; their expenses increased through the absence of thrifty housekeepers; and their young children abandoned to the mercenary care of some aged crone or disabled neighbour. The early training of the pit girls was such that in most districts they were looked on with contempt, and found it impossible to intermarry with other operative classes. It is but just here to recall the fact, that among the colliery proprietors some were to be found, even in those days, who would not permit women to be employed in their pits. The detail of female and infantile labour, although the most startling, was not the only abuse brought to light by the report of the commissioners. They exposed the vile system of early apprenticeship, then so much practised in these districts. In Staffordshire, it was usual at one time to apprentice the pauper children, or orphans, to working colliers, or "butties," at the

early age of nine for a period of twelve years, during which time the unfortunate wretch had to labour daily in a mine for the sole benefit of his master. This practice was so common in South Staffordshire, that, at the time the commissioners made their report, there were scarcely any boys in the workhouses of Walsall, Wolverhampton, Dudley, or Stourbridge. As might be expected, these boys were sometimes exposed to much ill-treatment at the hands of their masters. They were often forced, by blows, to work in dangerous places which the men would not enter, and, if not obedient to the orders of their owners, were taken before a magistrate, who invariably committed them to prison. Not only were these unhappy youths apprenticed at the early age of nine, but often they were handed over to the colliers at the tender age of seven, on trial for two years, and, at the end of that time, if found sufficiently strong, were duly bound for the term of twelve years. A great deal of evidence was collected regarding the hardship and ill-treatment which these boys had to endure. The following episode is the story of one of them, related by himself to one of the commissioners:—"I ran away from my master because he lost my indentures and served me very bad. He stuck a pick in me. He used to hit me with the belt and maul, or sledge, and fling coals at me. He served me so bad that I left him, and went about to see if I could get a job. I used to sleep in the cabins upon the pit banks, and get what I could to eat. I ate for a long time the candles that I found in the pits that the colliers left over night. I had nothing else to eat." This is, indeed, a sad picture of the youthful mining popula-

tion of that time. It must not, however, be assumed that the system of apprenticing young boys, and pauper children especially, was at that time confined to collieries.

The practice was general among cotton mills and other factories. The pauper boys were regularly sent down to the mills in Lancashire from the Metropolitan workhouses in batches of twenty at a time, and frequently a stipulation was made that one idiot in the score was to be accepted by the millowner. Another abuse recorded by the commissioners was the employment of young lads, almost children, at the steam engines used for lowering and raising the workpeople. Numerous cases are cited of boys not more than ten years of age being employed in that capacity; and, consequently, men were constantly being drawn over the pulley wheels, or let down so rapidly, that they were maimed or killed.

Lastly, the wages were not always paid in money; the spirit of the Truck Act was disregarded, and its clauses either openly violated or evaded by some subterfuge. When butties, or men who entered into contracts with the owners to win the coal, were employed, the men were usually paid at some public-house belonging to the said butty, where a portion—and a large portion—of their earnings was certain to remain.

Altogether, the condition of the mining population, as described by themselves in their evidence before the commissioners, must have been one of cruel hardship, coupled with degradation and misery.

Little or no care, with some exceptions, was bestowed on them by their employers. They had to work for

twelve, and sometimes fourteen hours a day, in low, narrow galleries, breathing a foetid and almost poisonous air, with water at times pouring down on them and rising up to their knees, contracting muscular and organic diseases which brought them to an early grave. Some roadways underground were only twenty-two to twenty-four inches high, and along these tiny children had to drag the coal tubs. Some mines were so ill-ventilated that the workpeople dropped down suffocated. As one witness describes : "We have often bad air. Some time since I lost a brother by it. He sank down ; I tried to draw him out, but I was forced to gang." But still they were compelled to earn their scanty living—as one girl said, "to keep their turn or clam," that is, starve. From time to time an explosion of gas would startle the neighbourhood, perhaps the whole country, and, as it were, galvanise into momentary existence a general sympathy and fellow-feeling ; but this died out with the burial of the last victim, and all subsided into the monotonous routine of the daily slave-like labour.

This was the condition of the colliers and their families in 1842 ; but even this was an improvement on what had previously been their fate. A witness explained that "thirty-eight years ago they had no belts or chains, but used to run along on one hand and feet and pull the corves with the other hand, and that was much worse for them." The conditions of labour, as described by the commissioners in their report, were quite bad enough to create a most painful impression. The existence of such a state of things had not been suspected, and the revelation led directly to legislative interference. It formed the basis of Lord Ashley's Bill to ameliorate the condition of

underground labour. The passing of this measure was an epoch in the history of collieries and colliers. It was the first measure which inaugurated the series of legislative aids, resorted to by those who, from motives of philanthropy or from sound judgment of social needs, desired to ameliorate the condition of so large and so deserving a section of the community, and which have latterly been adopted by the work-people themselves, who now look to acts of the legislature as their greatest protection.

CHAPTER III.

PARLIAMENTARY DEBATES AND PASSING OF LORD ASHLEY'S
MEASURE — APPOINTMENT OF INSPECTOR — DISAFFECTION
AMONG THE COLLIERS—THE MIDLAND COMMISSION AND SPECIAL
REPORTS FROM ROYAL COMMISSIONERS.

NOT long after the publication of the report of the Royal Commissioners on the employment of women and children in mines, namely, on the 7th July, 1842, Lord Ashley introduced his measure prohibiting the employment of women underground, and restricting the labour of boys. He described, in dispassionate language, the horrifying condition of the women and children in the mines as gleaned from the report of the commissioners. He considered that the revelation presented a "state of things not only disgraceful, but perilous to the country." In the course of his speech he explained the object of his measure. By the first clause he proposed to exclude altogether the employment of women underground. By the next, boys under the age of thirteen would not be permitted to work in the mines; and another clause provided that no persons under the age of twenty-one years were to be placed in charge of steam engines used for lowering or raising the colliers. The prevailing system of apprenticing young boys for a long term of years to working colliers was to be completely abolished; and another clause made provision for the appointment of inspectors to visit and inspect the mines and collieries, and report from time to time to one of Her Majesty's Chief Secretaries of State. In explaining

this provision, Lord Ashley observed that: "As for subterranean inspection, it is altogether impossible, and, indeed, if it were possible it would not be safe. I do not know what the case may be twenty-five years hence, but certainly, at the present time, I, for one, should be very loth to go down the shaft for the purpose of doing some act that was likely to be distasteful to the colliers below." The possibility of underground inspection thus foreshadowed, was realised much sooner than the speaker expected; and eight years after his speech inspectors descended the mines, not against the wish of the colliers, but in accordance with their desire. Lord Ashley's speech produced a profound impression on the House, most members being taken by surprise by the facts laid before them, and scarcely realising the possibility of such a state of things as existing in the country. Nearly every member who addressed the House took the opportunity of thanking Lord Ashley for his humane and benevolent work in bringing the matter before Parliament.

The Bill was read a first time on the 15th June, without any dissent, and taken in committee on the 22nd, when Lord Ashley presented several petitions from working colliers, thanking the House of Commons for the prompt action it had taken in their interests. The unanimity with which the measure had been received did not prevail at the discussion on it when before committee. The colliery proprietors, surprised and silenced for a time by Lord Ashley's eloquent speech and the disclosures of the commissioners, had now had leisure to consult together and agree on a line of defence. Other members not con-

versant with the subject, who had been startled by the fearful disclosures, had heard rumours of exaggeration, and possibly were rejoiced to think that matters were not so bad as they had been described. In the House the members representing colliery districts made a gallant defence, but in some instances marred the effect they desired to produce by endeavouring to prove more than was necessary or even possible. The member for Walsall, Mr. Scott, in defending the South Staffordshire Unions from the charge of binding their pauper boys as apprentices, pleaded, as an extenuation, that in South Staffordshire the occupation of collier "was generally considered a remarkably pleasant and cheerful employment." The hon. gentleman proposed to deal only with that portion of the measure referring to the employment of women, and postpone the other clauses; but this was not accepted by the committee. The only clause which was amended was that referring to the age of boys; and this, on the suggestion of Lord Ashley, who had accepted the views of a deputation from the mining districts on the subject, and proposed to limit the age at which boys should descend the pits to ten instead of thirteen years, and restrict the duration of labour for boys between the two latter ages to three days a week and twelve hours a day.

The opposition to the measure was much more decided in the House of Lords, where the Marquis of Londonderry came forward as the champion of the colliery proprietors. He commenced his attack on the measure on the occasion of presenting a petition from the colliery proprietors against the Bill, when

he accused the commissioners of great exaggeration ; he objected to the manner in which the evidence had been collected, declared that far too much had been said about vice and immorality, and seemed to think that education among colliers was a superfluity or luxury. He concluded by hoping " that Parliament would not legislate on the subject until some further inquiries had been made." Soon after this tirade, on the occasion of a discussion on the distress then prevailing in the manufacturing districts, the Marquis reverted to the Mines Bill as a measure which " must add to the distress already existing ;" adding, that, " if passed in its present form, it would entirely prevent the working of many of the most important coal mines in the country." He then announced his intention, should the measure alluded to come before the House of Lords, of taking the sense of the House on every clause, excepting that one relating to the employment of females ; more especially, he intended to oppose " that clause which empowered the Secretary of State to appoint inspectors of mines." Several petitions against the measure were presented by other peers ; among others, one from a very influential meeting of colliery proprietors in South Staffordshire, complaining of the hasty manner in which the House of Commons had dealt with the Bill in its early stages. It became evident, from the tone of some of the petitions, and the utterances at meetings held in the colliery districts to consider the measure, that a strong effort would be made by colliery proprietors to prevent the Bill becoming law.

The effect of the pressure brought to bear on the members of the House of Commons was evident when

Lord Ashley moved the third reading of the Bill on the 1st July. He was so pressed to adjourn the reading that he had to divide the House; and even then Mr. Ainsworth endeavoured to oust the measure by forcing a second division. It was, however, supported by Lord Palmerston, and read a third time, but the consideration was adjourned to the 5th, when Mr. Ainsworth took the opportunity of presenting fifteen petitions from colliers against the measure, and in a speech of some length explained his grounds for opposing it. He did not object to the prohibition to the employment of women underground, although he feared their exclusion from labour would cause great distress; but the interdiction of child labour he considered unadvised, as hundreds of children would be thrown out of employment and driven to the workhouses. The plan, to him, appeared unpractical, as it would be impossible to obtain the needful relays of boys. The report of the commissioners he characterised as too highly coloured, and declared his belief that the condition of the pit children was in reality better than that of those employed in factories. He urged Lord Ashley to be content for that session with the removal of women from underground labour, and thus enable a re-consideration of the measure, pointing out at the same time that no provisions were made for the prevention of accidents. Mr. Ainsworth expressed the views of the opponents to the measure, and other members followed him in the same strain, one member, Mr. Stansfeld, even going so far as to object to boys being made idle by Act of Parliament. Lord Palmerston, in closing the debate, pointed out that the measure had the united support of the Government,

and it was passed, despite the opposition, on the 6th July, and read the next day for the first time in the House of Lords.

Great opposition had been expected in the Upper House, and hints to this effect had even been thrown out by members of the Commons in the course of debate. The first allusion to it was made by the Bishop of Norwich, and was in its favour. He presented eight petitions praying that the measure be made law, as calculated to put an end to "shameful, disgusting, and disgraceful scenes"—a prayer in which the Bishop cordially concurred.

By way of antidote to these petitions, the Marquis of Londonderry presented others against the Bill, and seized on the occasion to attack it, fortifying his arguments by reading extracts from letters written by coal-owners and viewers; among others, he quoted a letter from Mr. Buddle, who expressed his opinion that the minimum age for boys to be employed underground ought to be fixed at ten years, and that the appointment of inspectors would be very objectionable. Allusion was made in this letter to a meeting of colliery owners in the north of England, at which Lord Ashley's proposals to restrict the labour of boys up to the age of thirteen, and limit that of persons in charge of steam-engines to twenty-one, had been accepted. But Lord Londonderry denounced these negotiations as a manœuvre to induce people to believe that the generality of colliery proprietors had given up their opposition to the measure. He also asked if the Government supported the measure, to which Lord Wharnccliffe, then President of the Council, replied that they intended to remain

perfectly passive. Lord Londonderry renewed his opposition almost daily, pleading the lateness of the session, the want of information, the futility of the Bill, and, among other observations, said that "the measure might be regarded as the commencement of a series of grievances which would be got up for the purpose of working on that hypocritical humanity which reigned so much." However, notwithstanding the bitter opposition of Lord Londonderry, the measure was proceeded with in the Upper House. The carriage of the Bill had been entrusted to the Earl of Devon, who had received various communications and deputations from colliery proprietors on the subject, and had, with the consent of Lord Ashley, altered several of the clauses. The second reading was moved on the 14th July by Lord Devon.

In the course of his speech, while dilating on the unfitness of underground labour for women, he was interrupted by the noble marquis, who informed him and the House that "some seams of coal required the employment of women." Irrational opposition could not be carried further. But this extreme and unreasonable statement was not supported. The measure, as finally presented to the House of Lords, differed materially from that originally brought into the House of Commons. The system of apprenticeship, instead of being abolished was modified, and restricted to boys not under ten years of age, and limited to eight years. The age of persons in charge of steam engines was fixed at fifteen instead of twenty-one years. The Bill thus altered met with a fair reception, although, as a matter of course, the uncompromising opponents of the measure made every

effort to get it rejected. Lord Londonderry proposed to postpone the reading for six months. Lord Radnor and Lord Wharncliffe argued that the information on the subject was insufficient, and that a select committee ought to be appointed to enquire into the matter. The strong language which had been used by the opposition was not allowed to pass without some comment; and the Bishop of Gloucester complained of the "monstrous proposition" laid down by Lord Radnor, that it is not a duty of the Legislature to enforce moral obligations, and asked Lord Londonderry to withdraw the expression "hypocritical humanity." Although the House was cleared for a division, Lord Londonderry found no one to second his motion, and the Bill was read a second time. Not only was the measure opposed in the House of Lords by coal owners, like Lord Londonderry, as useless and even mischievous, but the general principle of such legislation was opposed by distinguished and eminent members of the Upper House. On the committal of the Bill, Lord Brougham took occasion to warn the House of the tendency of such legislation, and the kindred measures which would spring from it. He concluded his speech by "entreating their lordships to bear in mind the cautions he had ventured to suggest when they were again called upon to deal with such subjects." Lord Londonderry seized on this opportunity to continue his attacks on the measure. This time he objected to the appointment of Government inspectors, and prayed for delay and further consideration, believing "practical benevolence more praiseworthy than mistaken humanity," and that the

result of the measure would be an increase of the poor rates.

Lord Radnor made a statement to the effect that "women and children might be improperly or indecorously employed in the mines, but the condemnation of the system, or even the desire to put an end to it, was not altogether a sufficient ground for passing an Act of Parliament to carry out such a desire." However, in spite of this uncompromising and ungenerous opposition, the recommittal of the Bill was agreed to by forty-nine against three votes. Notwithstanding the opinion thus expressed by the House, Lord Londonderry continued his unrelenting opposition to the third reading, and attacked the inspection clause, exclaiming, that as a colliery proprietor, he would say to such an inspector: "You may go down the pit how you can, and when you are down you may remain there."

This injudicious observation had the effect of causing the clause to be so amended that colliery proprietors would be required to furnish the necessary means to enable the inspectors appointed under the Act to visit and inspect the collieries, and with this alteration the measure was read a third time. When the Bill came again before the Commons, Lord Ashley complained of alterations made by the Lords. He described it as amended to be "invalidated in principle, and made inoperative," but nevertheless he wished the House to accede to the measure, as "it went to establish a great and valuable principle." The measure passed the third reading, and received the Royal assent on the 10th August, 1842.

This Act provided that after 1st March, 1843, no women and girls were to be employed underground,

nor boys under the age of ten years, except those who were already in the pits at the time; that no boy was to be apprenticed under the age of ten years, nor for a period exceeding eight years; that the wages were not to be paid at or near a public-house, and that the Secretary of State should be empowered to appoint proper persons to visit and inspect the mines and collieries. The clauses of the Act were enforced by imposing a penalty of not more than £10, or less than £5, on any person offending against them. Nothing but the most glaring abuses which clearly required reform were suppressed; but even this fragment of legislation met with the disapprobation of colliery owners. Few objected to the non-employment of women, but the prohibition of infantine labour met with much condemnation, especially on the part of the thin coal proprietors; and the proposed inspection was characterised as a useless and mischievous prying into the affairs of private individuals. On the other hand, the measure was received almost with indifference by the colliers. The main clause of the Act, namely, that relating to the non-employment of women, did not affect some of the districts at all. In the north of England coal field the practice had ceased for a long period, and in Staffordshire it had never existed at all. The miners of Lancashire, and some parts of Yorkshire, had expressed themselves favourably regarding the innovation. Only in Scotland, and perhaps South Wales, was there any feeling expressed in favour of the employment of women underground, and that was dictated by a fear lest the women, who were more or less the breadwinners of the families, would not readily find any other source of labour. The measure, in fact, did

not touch many of the grievances under which the colliery population had been suffering for a long period, and which were brought out prominently about this time in some, if not all, the mining districts. It is remarkable, that while Parliament was discussing a measure framed for the purpose of benefiting the colliers, they were agitating among themselves for the redress of grievances not considered by, and perhaps not known to, the legislators. The demonstration of the colliers, in 1842, culminated in riots which broke out soon after the measure became law. But to arrive at the immediate cause of these unfortunate occurrences it is necessary to cast a retrospective glance at the condition of the colliery districts during the year. For some time trade had been in a very bad state, so much so that wages had to be lowered, and many of the operatives discharged from the works. The distress and misery which ensued led to discontent, and eventually to rioting. The origin of the stagnation of trade had been the subject of Parliamentary discussions, and it had been variously attributed to the Corn Laws, to over-production, to deficient harvests, and other causes. The distress had also been discussed with a view of relieving the numerous unemployed workmen, who were in a starving condition, but no plan had been devised. Meantime the opportunity was seized by the Chartists to spread their doctrines, while fomenting a spirit of discontent among the unsettled working population.

The movement commenced among the mill workers of Ashton-Under-Lyne, and very soon spread over nearly the whole country. The colliers were not exempt from the excitement, and strikes and riots took

place in many of the districts, but notably in the Midland counties, where the hungry and unoccupied colliers became easy converts to the new principles at the bidding of the ranting demagogues who came among them in search of proselytes. Not that the colliers were ever enthusiastic Chartists, in a political sense, for they were too ignorant to understand the meaning of the doctrines preached to them. The Chartism of the colliers consisted in a desire to have their grievances remedied; and the Chartist leaders had adopted the device of dilating on these topics, and promising them a speedy remedy as soon as the new political faith should have been adopted by the country. Some of the complaints were reasonable and just. For instance, in Scotland the pays were made at long intervals, and masters actually charged the men interest, at the rate of one shilling in the pound, for advances made to them. Then, again, came complaints of arbitrary fines, oppressive deductions, and one-sided systems of measuring or valuing the coal wrought, which was usually done by counting the corves or tubs sent out of the pit, and not by weight. In Staffordshire, the men complained especially of the conduct of the butties, or middlemen, who were unscrupulous and despotic in their treatment of them. The hatred to the butties was so decided that, at Stoke-on-Trent one large firm, whose men were on strike, induced them to return to work simply by discharging the butties and altering the system of working. The great majority of the men in Staffordshire, however, remained on strike for several weeks, and the results of their riotous proceedings were disastrous alike to them and their employers. Houses

were wrecked or burnt to the ground; whole villages kept in a state of lawless uproar; and even large towns invaded and their peaceable citizens attacked. Force had to be used to gain and hold the upper hand over the excited rabble, and peace had to be restored by the aid of military power. Many of the ringleaders were taken prisoners and tried by a special commission, held in the disaffected districts, when they were severely punished. The evidence given at the several trials was such as to show that other and deeper causes than a desire for political reformation had actuated these misguided men. This induced the Government to cause a special enquiry to be made into the condition of the mining population, so as to ascertain what their grievances really were, and what remedies could be adopted to remove them. This enquiry, commonly known as the "Midland Commission," was held in the autumn of 1842, and professed to be: "A special enquiry into the condition of the persons employed in mines in the counties of Worcester, Warwick, Stafford and Salop; into their opportunities for obtaining religious instruction and school education; into the work which they perform and the wages they receive; and generally into the circumstances which affect their social position." The voluminous report which was published contains a large amount of information as to the condition of the colliers, giving an account of their grievances, and throwing much light on the probable cause of the disturbances. The "butties," or small contractors of South Staffordshire, were charged with much of the ill-feeling existing among the colliers. They were described as tyrants, who ill used and overworked the

men. One of them admitted that in a few years he could "get all the marrow" out of a collier. These middlemen not only overworked the men, but levied a sort of time-tax on them, by making them work overtime without pay—a system known in the district by the term "buildass." Then, again, the butties were invariably the landlords of the nearest public-houses, where they paid their men, and extorted a kind of black mail by compelling them to consume an excessive amount of ale. For this matter, the men when in the direct employ of the colliery proprietors were little better off, for then they were compelled to take all advances on their wages in kind at the master's store, commonly known as the "Tommy-shop." The public-house system was at that time rampant in the Midland counties. Not only were the men paid at taverns, but all their benefit societies, sick clubs, and kindred associations were held at a "public," and the landlord fixed a minimum consumption of drink for every meeting. This arrangement was pernicious to the funds of the society, because the members had to limit their subscriptions in order to enable them to pay for the unavoidable regulation drink. The butties were, of course, the gainers, as they were in general the owners of the public-houses. They were, in fact, all-powerful in some districts, and governed not only the men but the masters as well. For instance, a colliery proprietor, in his evidence, stated that "some butties in this parish, I am sure, have as much as £1000 in a pit, and it would be very difficult for their masters to pay that to get rid of them." The butties were not, however, the only cause of the rioting. A general feeling of dissatisfaction prevailed among the men,

and for a long time previous there had been a total absence of cordiality between employers and employed.

This state of affairs was, in a great measure, attributable to the truck system of paying the men. Although the payment of wages in any other form than the coin of the realm was against the Act (102 Wm. IV. c. 37), the law was openly violated by the employers in the Midland counties, who nearly all kept stores or shops, and supplied their men with goods in lieu of money as advances on the pays, which were held at long intervals. The advantages accruing to the employers were twofold. In the first place, they were able to carry on their business with much less capital than would otherwise have been required, as they obtained on credit the goods which they supplied to the men in lieu of wages paid in coin of the realm; and, secondly, they realised a profit on these goods. The men were compelled to take only those goods which the masters thought fit to provide, and these at very high prices. The system left the door open for extortion, and, unfortunately, the evidence as to the unfair treatment of the men is only too convincing. In general the Truck Act was openly violated, but in some instances ingenious devices were adopted to evade it. In one notable case advantage was taken of the eighth clause of the Truck Act, which gives the option to artificers to accept payment of their wages in drafts on a banker within fifteen miles of the place of employment. This clause was made use of by the Messrs. Lloyd, colliery proprietors and iron-masters in South Staffordshire, and they issued drafts for advances of men's pay on a Birmingham banker of

the same name, which were, however, accepted at the firm's store; and very few of the men went to the inconvenience of going to Birmingham for the cash, but simply exchanged their drafts for goods at what was designated as the "Quakers' Tommy-shop." It is noteworthy that the remedy placed in the hands of the men by the Truck Act, namely, the right of enforcing payment of the wages in coin of the realm, regardless of any advances paid in goods, was rarely if ever resorted to. It may be asserted with truth, that the butties, and public-house system, and the tommy-shops had more to do with the outbreak in 1842 than the lowering of the wages or the Chartist movement. The latter was, in fact, not even mentioned when the men first began to hold meetings in Staffordshire. On the 1st August 15,000 of them met at West Bromwich, and formed resolutions agreeing to go on strike and remain out of work until their terms were agreed to by the employers. They demanded four shillings a day for house coals, and eight hours work per day. They formed resolutions to the effect that buildasses were oppressive, that their wages should be paid in current coin of the realm, and, finally, that they would no longer suffer themselves to be treated as slaves.

This was the first occasion on record on which the colliers had rebelled against their treatment, and raised a cry of general grievances. There had been disagreements between masters and men, strikes or sticks, and lock-outs, but these had all been founded on a question of the more or less wages. It was the plain, unalloyed labour question—the operative demanding, and the employer refusing, to grant more.

But in these rebellious meetings of 1842 we find new motives urging the men. They now complain not so much of the scale of their wages as the manner of paying them, and the unjust deductions made from them for the benefit of the masters. During the unsettled period in 1842 they were led more to commune with each other, and discuss their grievances as a body or class; and the direct result of the great strike and Chartist meetings of 1842 was the formation of associations, co-operative societies, and trade-unions. The popular ebullition did not, however, last long; and what with the energetic measures taken to quell the rioting and punish the offenders, and the revival of trade, the country resumed its ordinary aspect, and the year 1843 passed in happy contrast to the tumult and turbulent scenes of the previous one. Though not remarkable through any social movement among the colliers, the year witnessed an attempt made in the House of Commons to re-introduce the employment of women in coal mines. Since the passing of Lord Ashley's Act his opponents had been conspiring to get it repealed. The plot originated in Scotland; and Mr. Cumming Bruce, the member for Elginshire, was entrusted with its carriage through Parliament. He gave notice of his intention to draw attention to the subject on the 20th February, 1843, and elicited the most unfavourable criticisms in England. The "Times" newspaper pledged itself, in case any attempt were made to revive the old system, "to expose such designs to the hatred and hostility which they deserve." Mr. Cumming Bruce, however, persevered in his attempt, and on the 22nd of February drew attention to a petition of Scotch miners

signed by about a thousand females, praying that the statute might be so modified as to enable them to return to their old labour. Mr. Bruce, while admitting the humanitarian principle of the Act, wished to see it carried out in such a way as not to cause distress or misery; to that end he proposed to allow women of eighteen years and upwards to be employed underground. He dwelt on the evidence embodied in the reports of the sub-commissioners, and characterised it as untrustworthy, asserting that the Scotch pitwomen were quite as moral as the English factory girls, and descanted on the great misery occasioned among the pit women by their discharge from employment. It was an easy task for Lord Ashley to prove that, whereas in England the women had been gradually removed from the collieries and absorbed in other branches of female labour, in Scotland the masters had turned them all out at once, "for the sake," as the noble lord said, "of creating confusion." The Scotch phalanx drove their point to a division, when they found themselves in a minority of 114; and thus ended the attempt of the Caledonian colliery proprietors to renew the condemned and odious system. No attempt was ever again made to re-introduce female labour in the coal pits, and the matter was never afterwards alluded to in Parliament. Another branch of the subject now began to attract serious attention, namely, the constant recurrence of fatal accidents at collieries. Several frightful calamities occurred about this time in the north of England, where the collieries were more developed and more dangerous than in other districts. On the 1st April, 1843, one explosion occurred at the Stor-

mount Main Colliery, causing the deaths of twenty-seven persons. In the following year forty men and boys perished through an irruption of water at Haverford-west Colliery; and ninety-five persons lost their lives at Haswell Colliery through an explosion of fire damp. This accident occurred shortly after the termination of a general strike, which had occurred during the year 1844.

The feeling of dissatisfaction which had prevailed during the previous years in the Midland counties, had in time spread to the colliers of the north, and they became unsettled and clamorous for reforms. An association of miners was formed in Manchester in the course of the year to obtain improved conditions of labour. It soon numbered over 60,000 members, and the majority of the colliers of the north of England joined it. When the so-called "binding" ended in March, 1844, they refused to renew the bonds unless certain conditions were granted by the masters. These were—Payment of all coals wrought by weight instead of measure; half-yearly instead of yearly bindings; the abolition of arbitrary fines; and a guarantee of four days' work per week. These conditions were unhesitatingly refused by the masters, and consequently the men, to the number of some 40,000, turned out on strike. The feud continued over no less than five months, during which period both sides displayed an unyielding obstinacy. The men suffered intense hardship and misery; the masters sacrificed their interests and jeopardised their property. In July, there being no signs of surrender on the part of the men, they were ejected from the cottages which they inhabited at the different collieries, and had to camp out on the moors, or on the road side,

like gipsies. As a last resource, the masters brought over a number of Irishmen to work in the pits. This expedient was more specially adopted by the Marquis of Londonderry, who had, throughout the dispute, taken a prominent part as a colliery proprietor, and whose many rash and ill-considered speeches led a German author to describe him as the "harlequin of the turn-out." However, the introduction of strange labour had the desired effect on the colliers. Seeing all chance of success lost by this move, and their means of livelihood taken from them by strangers, they succumbed to the necessities of their situation, and surrendered at discretion.

About this time, namely, in July, 1844, the inspector appointed under Lord Ashley's Act, Mr. Tremenheere, published his first report after examining the Scotch coal districts. He reported that the Act had been tolerably well observed, and had been attended with beneficial results. At the conclusion of his report he observed: "The general result, according to the evidence, appears to be that the displacement of female labour from the mines in Scotland has been effected, not indeed without temporary suffering, but with less than was anticipated, and that the ultimate consequence of the change will be eminently beneficial to all engaged in mining labour." Thus, after nearly two years working, the Act had not produced the terrible effects which had been prognosticated by its opponents. Even in Scotland, where the opposition to the measure had been so very strong, the change was effected without causing the ruin of colliery proprietors or filling the workhouses with starving women and children. In fact, the colliery proprietors

soon found that the alterations necessitated by the Act were to their advantage. They were compelled to use ponies, in the place of the wretched women and children, to drag the coal tubs along the galleries of the mine, and the change proved to be economical. On the other hand, the colliers, finding that their condition was being inquired into by a Government official, independent of the masters, began to lay before him their grievances. They complained of the bad ventilation and general mismanagement of the mines underground, and, above all, the unjust plan usually adopted of gauging the quantities of coal wrought under contract. They had a fixed conviction that they were not fairly dealt with in this matter; that the masters took advantage of them in measuring the coal on the surface, and made unjust deductions from their pay. The men, on their side, as the inspector pointed out, had adopted a most baneful practice of limiting the amount of work per man to restricted quantities, denominated the "darg" in Scotland and the "stint" in the north of England. This may be considered as almost the first combination among the men, and the origin of the many subsequent difficulties which arose between the masters and men in regulating the value of labour. Many of these difficulties between masters and men arose out of the utter ignorance of the latter. The early reports of the inspector dwell strongly on this point, as well as on their drunken habits, profligacy, immorality, and superstition—evils only to be removed by education. The necessity of improving on this state of things became more evident from day to day, not only among the more enlightened and liberal colliery proprietors,

but also among those who held, with Lord Londonderry, that "too much fuss was made about education." The working of the Act, and a more general consideration of the subject, pointed to the necessity of a more comprehensive measure, and a move was made in this direction at Newcastle-on-Tyne in 1844, where, in July, a meeting was held to consider the draft of a Bill for "establishing district registers of all mines and mining operations in England and Wales." The draft was sent to the members of the borough with a view to its being read in the House of Commons and printed, so as to be distributed in the mining districts. The Bill was duly read and ordered to be printed on 1st August, 1844. According to this measure, it was proposed to divide the country into four districts, each being placed under the charge of a registrar, acting under a committee of the Privy Council for Trade. Minute returns were to be obtained from the mines, comprising correct plans and descriptions of the workings, names of the owners and lessees, sections of the strata, number of the coal seams, with their inclination, direction of the dislocations, or faults, and the system of working the coal adopted. The registrar was to have the power of inspecting the mines, or appointing some one to do so on his behalf. A list of mines was to be kept in each district for the inspection of the public on payment of 2s. 6d., and correct copies of the plans of each mine were to be furnished on payment of certain fees. This proposed measure was too crude to become the basis of any enactment, but it had some importance, as it served to spread the idea of further legislation. This idea was, however, brought forward

in a much more forcible manner by the colliery accidents already alluded to, and more especially the explosion at the Haswell Colliery, by which ninety-five men and boys perished. This accident produced a profound sensation, more especially among the men. They formed the resolution to have their interests represented at the inquiry, and Mr. Roberts, the legal adviser of the Miners' Association, attended the inquest on their behalf. He suggested that an inspection of mines ought to be made by impartial men on the part of the Government, and drew up a petition to the Home Secretary, praying for the appointment of a special commission to inquire into the circumstances. In view of the great loss of life, and the urgent appeal on behalf of the men, the Government sent down Messrs. Lyell and Faraday to enquire into the cause of the accident and report. The appointment of the two Professors produced almost as great a sensation among colliery owners and viewers as the accident itself.

Before, and during the inquest, this step of the Government was much commented on, and after the publication of the report it was freely attacked by sundry associations. As soon as the opinions of the Professors became known they were criticised in pamphlets and newspaper articles in a tone more or less adverse to scientific suggestions in a matter so practical as coal mining. The report itself was almost confined to suggestions for ventilating the goaves of colliery workings, by means of pipes or tubes leading direct to the upcast shaft. The commissioners also observed at the inquest that more than half of the pitmen who gave evidence, some of them persons of intelligence,

and among them a master wasteman, were unable to write; and they remarked, with reference to this exhibition of ignorance: "We believe that if the education of the miners generally, and especially of those set over them, can be materially raised, it will conduce to the security of the lives of the men and the perfecting of the art of mining more effectually than any system of Parliamentary inspection which could be devised." The coal trade committee appointed a sub-committee to answer the statements of the Professors, and the report which they drew up set forth objections to the plan of ventilating the goaves proposed by Messrs Lyell and Faraday. Statistics were relied on to prove that out of eleven great explosions which had occurred in Northumberland and Durham during fourteen years, and exclusive of the Haswell accident, ten had occurred in collieries where the pillar workings had not been commenced, and where consequently there were no goaves. The opinion of this committee on education as a means of preventing accidents was vague and unsatisfactory, for, "while duly impressed with the value of education to every class of the community," they were satisfied to note that at "almost all collieries schools are patronised by the owners, and that increasing care is bestowed on the education of the workmen." The controversy resulted in shewing the necessity of acquiring more knowledge on the subject; in fact, to use the words of the commissioners in a letter subsequently addressed to Sir George Grey: "The consideration of all the circumstances suggests the expediency of a body of evidence being collected together and put on record respecting the casualties in mines." The colliers were not satis-

fied with these negative results, and commenced to hold meetings, at which they discussed the dangers of their occupation and other grievances. The meetings resulted in formulating a petition to the House of Commons, which was entrusted to Mr. Thomas Duncombe, who presented it on the 11th March, 1845. Copies of the report of Messrs Lyell and Faraday had been sent to the Lords-Lieutenant of the coal producing counties for distribution among the proprietors, in the hope of obtaining information, but the result was not considerable; and the Government, in August, 1845, appointed another commission, consisting of Sir Henry de la Beche and Dr. Lyon Playfair, to make inquiries into the condition under which explosive and other noxious gases in mines are generated, and to ascertain, as far as possible, the nature and condition of these gases, and to "advise as to the measures, if any, which can be applied in mitigation, if not prevention, of the evils inflicted through their agency."

These gentlemen were requested to hand in their report at an early period, so that the question might be brought under the consideration of the Government before the end of the year. The subject required a more lengthened enquiry than had been officially assumed needful, and the report was not completed until June, 1846. Meantime, the dangers of coal-mining were being discussed at public gatherings, before scientific associations, and in the press. Among the many essays on the subject, Professor Ansted read a paper at the meeting of the British Association for the Advancement of Science, in the year 1845, on, "The methods of working and venti-

lating coal-mines in the north of England." In this communication the Professor made many suggestions, which were subsequently either proposed to be, or actually embodied in legislative enactments. He pointed out the danger of having only one shaft, and depending for the security of the mine on a partition of boards, termed a "brattice;" suggested the advisability of working coal mines in panels of moderate dimensions; and considered that no great improvements in the working of collieries would ever be effected without some kind of Government interference. This last opinion of Professor Ansted was, at that time, shared by many persons connected with mining operations.

It was felt that some control ought to be exercised to prevent, if possible, the recurrence of these accidents, and the great loss of life which ensued. During the year 1845 a series of explosions had taken place, and among them one at the Jarrow Colliery, by which twenty-nine lives were lost. The Government sent down Dr. Lyon Playfair to examine the mine, and report as to the cause of the accident. The result of his investigation was to condemn the practice of having only one pit at a large colliery, and to expose the blameable want of education prevailing among overmen in charge of the underground workings. At the Jarrow Colliery neither of the deputy overmen could write or read fluently, and Dr. Lyon Playfair remarked that "the men under the viewer entrusted with the care and ventilation of the mine are ignorant and uneducated." The want of education among the officers of the colliers, and the ignorance of the colliers, are also alluded to by the Inspector of Mines. He, in his

report for the year 1845, records several instances where the Act had been evaded by the proprietors. In Scotland, legal proceedings had to be instituted against several colliery proprietors for employing women underground. These women were mostly such as had long been accustomed to the work, and who found great difficulty in finding or fulfilling any other employment. The distress among them was so great that they enlisted the sympathy and assistance of charitable ladies in England, who made up a purse for their benefit. Scotland was, however, not alone in reverting to the old system. It was computed that in 1845 about 200 women were still employed in the coal mines of Lancashire. The men persisted in upholding the darg and the unions, and were only too eager to listen to the voice of the demagogue when advocating a line of conduct conducive to indolence and suggestive of gain. In Yorkshire, greater readiness was evinced to remedy the deficiencies of the past; but here, as everywhere, much depravity existed among the young. The "hush-shops," or unlicensed public-houses, where gaming was allowed, were mostly supported by pit lads in their teens. Some improvement became perceptible in the following year, although in some districts policemen had to be placed on the watch to prevent women descending the pits. Many colliery proprietors considered that they complied with the Act by giving general orders to their men not to employ women, or boys under ten years of age, and endeavoured to throw the responsibility on the men. At this period the condition of colliers in general was a deplorable one, owing to the prolonged strikes. In the north of England, where the strike in 1844 had

lasted six months, the men continued for a long time to struggle with the incubus of debt they had contracted during that period, living in squalor from the want of household effects, and having to contend with the opposition of the fresh hands introduced into the pits. A great deal of the debauchery existing among the colliers at the time, and some of the memorable strikes, must be attributed to their utter ignorance. The inspector, in his early reports, dwells pointedly on this subject. Not only was some education needful for their moral and social improvement, but even for their safety underground, as pointed out by the reports on the causes of explosions made by Sir Henry de la Beche and Dr. Lyon Playfair. The importance of education, now first touched on, forms one of the most important elements in the consideration of the subject under review, both as regards the welfare and the safety of the men.

CHAPTER IV.

REPORTS OF COMMISSIONERS, COMMITTEE OF THE HOUSE OF LORDS,
1849, AND PASSING OF THE COAL MINES' INSPECTION ACT
OF 1850.

THE report of the two commissioners, Sir Henry de la Beche and Dr. Lyon Playfair, on the condition of the collieries of the kingdom was completed in June, 1846. It contained much information and many suggestions. The condition of the collieries in different parts of the country was found to vary considerably. In some districts little was left to improve; but in others, to use the words of the commissioners, it was "a matter of surprise how the works could be permitted to remain in so defective a state." To amend this condition of things, a "careful and judicious inspection of convenient districts by competent persons" was recommended. The necessity for some official supervision of the collieries had been apparent to most of the commissioners who had, from time to time, reported on the subject for Government. Sir Henry de la Beche and Dr. Lyon Playfair anticipated that inspection would tend to insure "the proper ventilation of collieries, efficient knowledge on the part of the subordinate agents, and proper punishment for foolhardiness, or carelessness, on the part of the colliers. They also pointed out in their report the great importance of correct plans of the underground workings, shewing the system of ventilation and the

mode of getting the coal. But they concluded their report with the curious proposition to raise the necessary funds for carrying out a system of inspection by imposing a tax of one farthing on each ton of coal raised. It was not likely that the colliery proprietors, who, as a class, objected to any system of legislative inspection, would ever agree to a tax, however small, in order to provide funds for carrying out a plan they considered inimical to their interests. These views of the Government commissioners were repeated again and again in the course of further investigations as to the cause of colliery explosions. During the year 1846 several serious accidents took place, into which the Government instituted enquiries. At the Risca colliery, S. Wales, in January, and a few months later at Coppull, in Lancashire, and Oldbury, in Warwickshire, explosions occurred by which sixty-one lives were lost. Sir Henry de la Beche was instructed to examine and report on these collieries. The result of his examination shewed much laxity of discipline in the management, great ignorance among the men, and very defective ventilation. At Oldbury, no system of ventilation appeared to have existed. The reports were written by Mr. Warrington Smyth; and Sir H. de la Beche, and Dr. Lyon Playfair, in commenting on them in a letter addressed to the Home Secretary, thus expressed their opinions: "We consider these reports as bearing out the view of the expediency of the effective inspection of collieries, whereby proper ventilation and the careful use of lights may be obtained on the one hand, and the owners and workers of collieries be secured in some degree from the carelessness and foolhardiness of the colliers on the

other—a measure indicated by all the evidence attainable respecting colliery explosions, both of those of sufficient magnitude to arrest the attention of the public and of the miner, though far more numerous accidents to the working collier.” Thus a system of colliery inspection was now directly and strongly recommended by the Government commissioners as the best means of preventing colliery explosions. That which in 1842 was considered almost an impossibility—namely, underground inspection—was now openly and officially advocated. It was again advised by the same commissioners, after the enquiry they made into the explosion at the Ardsley Colliery—one of exceptional magnitude—by which seventy-two men and boys were killed. In concluding their report on this accident, they recommend: “That a system of inspection, one not over-meddling, but at the same time securing the most effective ventilation and the proper use of lights, should be adopted.” At the enquiry made as to the cause of this explosion, many disclosures were made as to the imperfect ventilation and general laxity of the management. Although the coroner’s jury returned a verdict of accidental death, they coupled this with observations as to the want of efficient regulations in the district with reference to naked lights, and an opinion that Parliament would be justified in “framing such a code of regulations as would give greater security to persons employed in mining operations.” Hitherto, only a system of inspection had been submitted to Government as the best means of preventing colliery accidents; but the jury on the Ardsley accident went a step further, and suggested that a code of rules for the guidance of colliery managers ought to be formu-

lated and enforced by an Act of Parliament. The idea of inspection about this time was also taken up by the men themselves in earnest. The views which they may have previously entertained had not been pressed on public notice; but soon after an explosion at the Round Green Colliery, namely, on the 23rd November, 1846, a numerously attended meeting of colliers took place at Dudley, at which a memorial to the Secretary of State was agreed on, praying the Government to introduce a measure relating to coal mines, and appoint underground inspectors. This step was followed by a petition sent up in May, 1847, and emanating from the Miners' Association of Great Britain—a powerful combination of workmen, including members from all the mining districts. This petition was entrusted to delegates, who had an interview with Mr. Thomas Duncombe, and the document was duly presented to the House of Commons, and ordered to be printed, on the 20th May, 1847. This petition had been carefully drawn up, showing that the men had the good sense to secure the assistance of able secretaries. It was remarkable also as embodying nearly all the innovations or improvements desiderated by the men, and most resolutely advocated by them during following years. The document began by referring to the legislative measures passed for the benefit of other trades; the petitioners had “seen and heard, with great satisfaction, that several laws have been passed of late years to better the condition of working-men in different trades, and for their and their children’s protection and safety from injury and accident, and to assist in the improvement of their minds and habits;” and, passing on to the subject of education of children,

they “observed with much satisfaction the laws compelling the masters in factories to provide some amount of education for the children who work in them; and your petitioners submit to your Honourable House that a similar plan would be of great use to the children of colliers.”

Thus they prayed for the education clauses so much opposed by the masters, and by some in the supposed interest of the men. The most important paragraph of the petition related to the safety of the mines and inspection. It ran as follows:—“Your petitioners submit to your Honourable House that inspectors should be appointed to visit all the mines, and that some of these inspectors should be men acquainted with colliery work; that such inspectors should see that accurate maps are made of all the workings of the mines; that these inspectors should grant licences to mines when they consider that due provision and care has been used to prevent accidents and ensure good ventilation; and that without such licence no mine should be permitted to work. That penalties of £100, at the least, should be inflicted in case of any deviation from the order of such inspector; and that such penalties should be paid half by the landlord and half by the tenant of the mine, and should form a fund for the support of the families of those who die from explosions or other accidents in the mines.” In this petition the colliers gave expression to their idea, so erroneously entertained but so persistently advocated for many years, that the responsibility of management should be borne by the Government inspectors. They also prayed for a public registration of all mines; that the Truck Act

should be revised ; and that all coals raised should be paid for by weight. Although by far the most important, this was only one out of numerous petitions having a similar object presented to Parliament at the time, and which eventually were brought under the notice of both Houses—in the Upper House by Earl Fitzwilliam, and in the Lower by Mr. Thomas Duncombe, the member for Finsbury. In the Upper House, Lords Wharncliffe and Campbell, while admitting the importance of the subject and the discredit attached to the great loss of life, denied that a system of inspection would tend to diminish the number of accidents. Colliery inspection had never been popular in the House of Lords, where it had been strenuously opposed from its inception. In the House of Commons, the subject was discussed on the introduction of a Bill by Mr. Duncombe, on 16th June, 1847. This measure provided for the appointment of three inspectors, who were to visit and examine each colliery at least four times a year, with power to examine witnesses on oath, and retain the services of any persons deemed necessary, and of sub-inspectors, who were to report to the chief inspectors. An office of inspection of mines and collieries was to be provided in London or Westminster, to which the owners of collieries were to send returns detailing the mining operations. Notices of all accidents were to be sent to the nearest sub-inspector, who was to examine the mine and report, but in case of fatal results the chief inspector was to be informed at once. The coroners were to give inspectors two days' notice of all inquests. The wages were to be estimated according to weight only, and paid every week in money to each man

separately. The inspectors were to report each year to a Principal Secretary of State ; and the expenses of the Act were to be covered by a tax of one farthing on every ton of coal sold : any surplus to be devoted to educational purposes, and any deficiencies to be paid out of the Consolidated Fund. Such were the provisions of this somewhat extraordinary measure. On the order for the second reading, on 30th June, it was opposed by the Home Secretary, who said the matter was under the consideration of Government ; and Mr. Liddell, the member for North Durham, described it as " most ridiculous," and advised the appointment of a select committee. Although this measure was not acceptable, the principle of inspection received the favourable consideration of the House of Commons. Mr. Duncombe was pressed to leave the subject in the hands of the Government, and he ultimately withdrew his measure, not, however, without complaining of the course pursued by colliery proprietors, whom he described as " coal kings."

A few weeks after this discussion in the House of Commons an explosion took place at the Kirkless Hall Colliery, near Wigan ; and Mr. Duncombe, on the 1st July, called attention to this accident, stating that the pit had been unsafe for some time, and that even on the day of the accident the men had remonstrated with the manager ; moreover, that six men had been left in the pit, and the owners refused to allow any one to descend in order to ascertain if they were dead or alive. He trusted that the Home Secretary " would send down commissioners to make instant inquiries." But Sir George Grey repudiated the principle that Government ought to be saddled with these investiga-

tions, and considered that "the magistrates and local authorities ought not to be exempted from the duty." The Kirkless Hall accident was referred to a few days later by the Home Secretary, who had received a communication from the local magistrates, giving their opinion that the men left in the pit after the explosion could not have been saved. Mr. Duncombe, however, reiterated the information he had received, on good authority, to the effect that the men were "bricked up, and could not escape." Imbued with the feeling of the just necessity for some measure for the better regulation of collieries, and disappointed at the inaction of the Government in the face of successive accidents, Mr. Duncombe introduced a second Bill, which was read on the 14th July, 1847. This measure was confined to prohibiting the use of naked lights and gunpowder in fiery mines. It was made felony to use open lights or blasting powder in places where fire damp was known to exist; and owners were made responsible for their use, even when so done without their consent or even knowledge. This measure met with strenuous opposition, although many members spoke in favour of the principle of colliery inspection, and was rejected by thirty-three to twenty-three votes. With this discussion the subject dropped in Parliament for the remainder of the session. Although no measure had been passed, the principle of further legislation in reference to mines had made great progress, and it was evident that the time was drawing near when a Bill would have to be introduced, or at least supported, by Government. Meantime, the inspector of mines continued to visit the mining districts and report on the general

condition of the population. His report for the year 1847 showed some improvement in the state of affairs, and a better understanding between masters and men. However, women were still to be found in the pits, and boys were employed under the specified age. He found great difficulty in enforcing the provisions of the Act in the absence of such powers as had been provided for in the Factory Acts, and also because no certificate of age was required from the boys before employment. No provision had been made for the attendance of children at school, and it was a matter for regret that the legislation had not compelled parents to send their children to school. It appeared that, although through the munificence of large colliery proprietors, as well as the charitable generosity of the public, many schools had been established, the attendance was very unsatisfactory. Yet the importance of education among the mining population was very generally recognised, not only for their moral and social improvement but also for the safety of the collieries. The inspector, in referring to this subject, makes use of the following expressions:—"It has been made perfectly clear that the immediate causes of the deplorable accidents that are continually occurring in mines, especially from explosions in collieries, are to be found in almost every instance in just that sort of conduct in the presence of danger that may be expected from dull and unintelligent minds. It is seldom, perhaps, so much from a reckless disregard of danger, as from a stolid ignorance or obliviousness of the natural consequences of acts which expose them to danger, that most of the serious and fatal accidents in mines occur." The consequences of ignorance were

more disastrous in the case of overmen, who had heavy responsibilities and duties, which in reality required some rudiments of knowledge. It was a lamentable fact, that at very nearly all the enquiries into the causes of severe explosions the ignorance of these men came to light, and was commented on by the commissioners, so much so that they attributed in a great measure the number of accidents to this source. This, indeed, gave rise to the suggestion, which began to find many supporters, that colliery managers ought to be subject to some examination, and obtain certificates of competency before entering on their responsible and dangerous avocation. Such a system was strongly advocated by the men at the meetings of the associations and unions, or their delegates.

These combinations had now become very general among colliers, and exerted a considerable influence on the course of legislature. Originally organised for the purpose of endeavouring to redress certain grievances—some real, some imaginary—they frequently went beside this object, and became simply combinations for the purpose of enforcing an increase of wages, regardless of all consequences. The inspector, in his report for 1847, observes with reference to these associations: "It is not to be disguised that these combinations arose originally out of a feeling founded, probably, on a common experience that wages were not raised by the masters in good times in proportion to the rise in the market price of coal." This observation holds good in many cases, seeing that a low rate of wages is of paramount interest to the coal master, as three-fifths of the cost of raising coal is absorbed by labour. The want of confidence on the part of the

men led to constant wrangling between Capital and Labour; and many expedients, some of them unscrupulous, were resorted to by either side to command the value of labour. There is nothing unreasonable in the union of any class, be it masters or men, in order to defend their interests by legitimate means; but, when the limits of fairness are exceeded, they become simply combinations for evil. Thus, when men unite to force a rate of wages so high that the produce becomes too dear for the market, they arrive at what may be termed the wages paradox, for the rise ends in a total absence of wages through the stoppage of the works. The good results of these unions were also often marred by inconsiderate or bad management. The interests of many thousand men were not unfrequently entrusted to shallow demagogues, who laboured more for their own selfish ends than the weal of the associations. It must, however, be observed here, that during the great strikes which of late years have clouded our commercial prosperity, only legal and equitable means have been resorted to by the unions to attain their objects, and that these mass movements have not been characterised by scenes of violence, as was too frequently the case in former days. In fact, in order to attain solid results by such combinations, the object must be a reasonable one, and the means employed fair and honest. During the year 1848 a series of strikes occurred in Scotland, resulting in great misery and suffering, and opening the way for a considerable immigration of Irishmen. This led to disturbances, which caused serious anxiety to the authorities, who thought it necessary to quarter a troop of

yeomanry and a detachment of military in the colliery districts.

Although many unions had for their sole object the raising of the price of labour, and the men were all vitally interested in the question, yet many associations were either entirely or partly formed for the purpose of obtaining increased legislation to improve the condition and the safety of the mines. It was patent to all that some step would have to be taken in that direction by Parliament at an early period. The results of Lord Ashley's Act had not been very great beyond rectifying the abuse of female labour underground. Accidents continued to occur, and no very tangible improvement was to be noticed in the condition of the work-people. The inspector, after an experience of six years, in speaking of the different mining districts, described how they varied in condition in these words: "Some of them—those who *had* the benefit of good and wise management, and *are* placed in favourable circumstances—being much above the average level of the labouring population. Others—and those, I fear, the great majority who have been collected within a comparatively short time round the iron works and collieries of the great iron-producing districts—as far below what any well-wisher of his country would desire to see as the average condition of the labouring class, and their mode of life, conduct, and intelligence." From this statement, it must be inferred that at that time, 1848, or six years after the passing of Lord Ashley's Act, but little improvement in the condition of the mining population had taken place. Something had been gained, however, in removing the women from the underground workings,

restricting infantine labour, and obtaining most valuable reports from the inspector on the general condition of the work-people ; neither had there been any great progress noted in the management of the collieries. The generality of owners resisted innovations. Some feared the expense, others the inefficacy of proposed improvements, and most took but little interest in the matter. In some districts the working of the coal pits was left in the hands of butties, or charter-masters, who, in reality contractors, engaged to deliver the coal at the pit bank at an agreed price per ton, and took on themselves all the responsibilities of working. These men dreaded an inspection on the part of the owner quite as much as the latter on the part of the Government. Thus the underground management was in many instances defective or inadequate, and the stimulus of Government inspection was needed to bring about an improvement. The most important amelioration required was better ventilation. This was necessary for the health of the men, who worked in a vitiated atmosphere, and the safety of the mines producing explosive gas. The many explosions *were* eloquent, though sorrowful, arguments of the necessity of better ventilation, and to obtain this it was generally admitted that some kind of inspection was needful. The inspector, in making a special report on this subject, with the experience of official inquiry and a general acquaintance with the views of colliery proprietors and managers, arrived at the conclusion that "the only kind of inspection on the part of the Government which would not be liable to grave objections, would be inspection without compulsory powers of

interference ; and that such inspection, conducted by gentlemen uniting scientific with practical knowledge, would tend to diminish the frequency of fatal colliery explosions." The enforcement of any particular mode of ventilation, considering the divers condition of collieries situated in different districts, was deprecated, as well as any transfer of responsibility from the colliery proprietors to the inspectors. The duties of the inspectors are foreshadowed in diffusing knowledge, suggesting improvements, and pointing out dangers. In conclusion, the inspector gives his opinion as to the possibility of a more perfect system of inspection in the following words : " I have no hesitation in saying that among the great number of persons engaged as proprietors or lessees in working, or as mining engineers, agents, &c., in managing collieries, with whom I have conversed, in all the chief mineral districts, I have met with none who would not receive candidly and thankfully any remarks that a gentleman of ability and discretion, appointed by Government, might feel it incumbent to make." This view was supported by many owners and colliery managers, and most strongly by the petitions emanating from the men, which have been already noticed.

A terrible illustration of the importance of the subject was given on the 24th of January, 1849, when an explosion occurred at the Darley Main Colliery, near Barnsley, by which seventy-five lives were sacrificed. In compliance with a request from the magistrates of the county, the Government at once sent down two commissioners, namely, Messrs. Tremenheere and Warrington Smyth, to examine the mine, attend the inquest, and report on the occurrence. The enquiry into

the cause of this accident disclosed a very defective management. The ventilation, as well as the whole discipline of the mine, were entrusted to an under-viewer who could hardly read, and not write at all. The quantity of air passing round the workings was inadequate, and the system of coursing it defective. Mr. Nicholas Wood, in giving evidence, also pointed out that large areas of goaves were filled with firedamp, which a change of atmospheric pressure or falls of the superincumbent strata might force, without a moment's notice, into the working roadways, where naked lights were used. The power of the ventilating furnace was impaired by drawing water up, and thus cooling the upcast shaft. Mr. Warrington Smyth, in his official report, pointed out the defective management of the colliery, the insufficiency of ventilation, the imperfect mode of working the coal, and the fact that the underground agent was illiterate. The coroner's jury, after a lengthened inquiry, returned a verdict of accidental death, coupled, however, with the following rider :—

“ We most strongly recommend to the proprietors that a better mode of ventilation be adopted before they recommence working the mine, as a preventive against any similar occurrence; and we think, from the evidence given before us, that the removing of the machinery used for drawing water out of the upcast shaft is essentially necessary, so as to allow the air passing out of the mine to have a better and freer outlet; and we also desire that Mr. Badger, the coroner, report to Sir George Grey, and that he make known to Her Majesty's Government, that we think it advisable that they should appoint a scientific and practical person to occasionally inspect the collieries

in the district and see that there is proper ventilation, and hear any complaints by the work-people employed therein." Shortly after the verdict, on 16th February, 1849, Mr. Cayley, referring to the accident, asked if the Government were prepared to adopt the principle of inspection, and whether they would institute a system of examination for colliery viewers. In reply to which, the Home Secretary stated that the subject was under the consideration of the Government, without pledging it to any decided course. Meantime petitions were being sent up from the coal districts in great numbers, and numerous signed, praying that steps be taken by Parliament to improve the condition of the colliers and reduce the annual loss of life. The subject was now fairly ripe for legislation. The enquiries instituted by Government had disclosed a blameable state of affairs; the collieries were in many cases ill-managed, the overmen illiterate, the ventilation defective, the discipline lax, and human life disregarded. The recommendation pressed on Government was a judicious system of inspection. The colliers were combining to obtain safeguards against the insufficient management which shortened their lives and rendered their work so perilous.

From time to time, when a terrible accident occurred, a thrill of horror spread over the country, and people enquired if nothing could be done to prevent such catastrophes. Suggestions, inventions, and information of all sorts were then offered, and, above all, petitions poured in on Parliament in great numbers. Such was the case after the fatal explosion at the Ardsley Main Colliery. Among the petitions was one from Dr. Goldsworthy Gurney to the House of

Lords, which became the subject of a conversation in the Upper House in June, 1849, when Lord Wharncliffe "thought it was well worth while of Her Majesty's Government to consider whether some inspection ought not to be established into the state and condition of coal miners," and moved for the appointment of a select committee to enquire into the subject, which was agreed to on the 18th June, 1849.

In the House of Commons, Mr. Duncombe introduced a Bill on the 4th July, based mainly on the petition presented under the auspices of the Miners' Association in the beginning of the year. He admitted, in fact, that it "emanated from the working colliers." This measure provided for the appointment of inspectors, who were to visit each colliery at least four times a year, and to have power to order any alterations they might consider advisable for the safety of the men. The principle of inspection, as thus proposed, was opposed by Government, the Home Secretary observing that "it was extremely desirable that no portion of the responsibility which justly attached to the owners should be transferred to Government or Parliament." The measure was discussed; but it was so impracticable and so inquisitorial that it met with little support. It was also known that the Government had the matter under consideration, and that a select committee of the House of Lords was making an enquiry into the subject. Mr. Duncombe was pressed on all sides to withdraw his measure. Although the select committee was at this time enquiring into the subject of coal mines, the Government considered it advisable to appoint two

commissioners, namely, Professor Philips and Mr. S. K. Blackwell, to examine the collieries in different districts, and report to Government on their condition, with a view of obtaining additional information. The instructions given to these gentlemen were extremely complete and minute, directing them to prosecute enquiries into every important point connected with the working of collieries. Before these reports were handed in to Government, the Lords' committee had completed its labours, having collected a great mass of valuable evidence, which, accompanied by a report, was laid before the House on 1st August, 1849. This report had been looked forward to with great interest, as it was fully expected it would contain recommendations on which any new measure would be based. The colliery proprietors felt some anxiety lest the report might contain recommendations either impracticable or injurious to their interests. The enquiry was as complete as the limited time admitted. The committee had examined thirty-nine witnesses, from every district and of every class, on nearly every subject connected with collieries.

The mass of evidence thus collected enabled the committee to arrive at definite conclusions, and to embody suggestions as to future legislation in their report. They found that the condition of the collieries varied greatly in the different districts, but that collectively they were not in as good a condition as they ought to be. In the report, they observe that "the actual condition of the coal mines of the country, as respects ventilation, appears to be widely different, and it is to be feared for the most part seriously defective." This statement was amply justified by

the evidence of all the eminent viewers, who were of opinion that the collieries ought to be better ventilated, and that such improved ventilation would tend not only to the reduction of fatal accidents but actually to economy in getting coal. Thus, Mr. George Elliot (Sir George Elliot, Bart.) says: "I am a great advocate for plenty of air in a pit. I believe it is the cheapest way to work mines safely."

Mr. John Thomas Woodhouse, in answering a question as to the economy of efficient ventilation, recommends it "not only as a measure of safety, but also of economy in the preservation of timber, and in the health of the men generally." Again, Mr. Dunn thought "the better a colliery is ventilated the more economically it can be worked." The various causes of accident, such as falls of roof, inundations, and others, were also examined into; and although many of these are inevitable in so dangerous an occupation, and some of them caused by the neglect and foolhardiness of the men themselves, the opinion elicited from the majority of witnesses was in favour of Government inspection in some form or other. Some of the witnesses gave a more or less qualified approval to the proposal, though approving of the principle. Mr. George Elliot, for instance, said: "I should not object to its being done, since I believe that it would have a good effect upon other counties than ours (*i.e.*, Durham). If it would have the effect of bringing other places, where we hear of so many frightful accidents, up to the level of our condition, it would tend very much indeed to lessen the loss of human life which we are daily hearing of." But he considered that it would not do to give the inspectors any

power in the management of mines ; and, above all, that they ought to be competent miners. "They ought to go down the pits, and they ought to be men that understand the pit when they are down it ; in fact, they ought to be pitmen." Mr. Nicholas Wood gave a more qualified assent to Government inspection ; for, on being asked if the inspection of mines would materially diminish the number of accidents, he said : "I have great doubts of that. I think the public are rather placing more dependence upon the inspection than will be realised by its adoption ; but still, looking at the number of accidents which are continually happening—seeing, also, that several of those accidents have happened where the system of ventilation was very imperfect, and which might not, probably, have happened had a better system been in operation—I think that the time has arrived when something ought to be done."

Mr. Woodhouse did not object to inspection, but he referred to the opinions held by the colliery proprietors, some of whom were indifferent, and others averse to, the system, objecting to the interference, and uncertain as to what it might ultimately lead to. One great objection was on the score of cost. It had been suggested that the expenses of Government inspection should be defrayed by the colliery proprietors, which seemed to them very unfair, as the collieries free from danger would have to be taxed in order to meet necessities which did not apply to them. In the Wigan district, at a meeting of coal owners, a resolution in favour of Government inspection was adopted, with only one dissentient voice out of fifteen. But the inspection then approved of was to be of

a limited character, and the power of the inspectors restricted to examining the mines and making suggestions. While the colliery proprietors and viewers thus gave a qualified assent to inspection, the working colliers, as represented by those who gave evidence, supported it as the best means of saving life. Some of the evidence given by working colliers abundantly showed that the details of management were frequently defective, and that the plans of the viewer were often not carried out at all.

The under-viewers and men appeared to have a good practical knowledge of ventilation, and gave good evidence. One of them summed up his ideas on the subject as follows :—" Different men have different notions of taking their air at starting, and in case they start badly, they never get into a right train; because, if they start badly, their judgment is bad to begin with; and if a man has bad judgment when he begins he cannot be expected to go on well."

The committee, in their report, concurred with the majority of witnesses in recommending: "That Government inspectors should be invested with no direct powers beyond those of entering and examining mines, and of investigating the plans, so far as may be necessary for judging of their internal condition and arrangements; and their duties should be limited to recording and reporting, making suggestions, and communicating information to the managers and owners." Before leaving this subject, they recommend Government inspection as a protection of life and limb; for "it cannot be doubted that it is the imperative duty of Parliament and the Executive to adopt, for the purpose of attaining such security as is

undoubtedly within the reach of precaution, any steps, whether of the nature of inspection or of direct enactment, consistent with the free pursuits of industry and commerce." In the course of investigating this question, evidence was taken on the system of Continental inspection. The practice adopted abroad is not applicable to the conditions under which mineral property is held in Great Britain. On the Continent the State owns the subsoil, and, therefore, all the minerals. The leases, or "concessions," are granted under certain conditions by the Government, and subject to the laws concerning mines and the rules laid down for working them. From the evidence given before the committee, as well as from the official reports made by commissioners for the Government, it appeared that the general condition of the foreign mines was better, and the overmen and miners were superior in education, to those of Great Britain. In reference to this, it may be observed that whereas our mining population had been neglected and treated as outcasts, until they had become almost a caste of low degree among their compeers, in other countries, where the State had for centuries derived large revenues from mining operations, the workers were encouraged, privileged, and distinguished above their fellows. But the principle of inspection, as applied in England, was to be that of saving life, and not of management; and this principle had now been accepted and recommended to Government by a select committee of the House of Lords. Further information on the condition of the collieries was furnished by the reports of the commissioners, Messrs. Blackwell and Phillips, recently appointed to examine them in

different districts. Mr. Blackwell had the opportunity of examining into the cause of a serious explosion at the Letty Shenkin Colliery, on the 10th August, 1849. After an enquiry which lasted four days, it appeared that this mine, though very inefficiently managed, was not below the average collieries of the district in that respect, and accordingly a verdict of accidental death was returned.

These reports were laid before Parliament at the instance of Lord Wharncliffe, chairman of the select committee of the previous year, on the 6th May, 1850, when he referred to the increase of deaths through colliery accidents, and the advisability of appointing competent colliery inspectors. Mr. Blackwell, in his report, pointed out that the mines in the Newcastle district were at that time much deeper, and worked at a greater distance from the shaft, than those in other districts; and that whereas the colliery leases in the north averaged from 500 to 2000 acres, in Lancashire and Wales they were 25 to 250 acres, and in Staffordshire often not more than 10 or 20 acres. On this fact he commented, and said what has since proved to be true: "It will probably be found that the coals of South Wales and Lancashire, and perhaps those of Eastern Yorkshire and Derbyshire, when they are worked to equal depths at a distance from the line of outcrop, and in such larger tracts as the increasing depth will require to be annexed to each, winning will be equally fiery and dangerous unless the best systems of management and ventilation are adopted." He found the collieries of Yorkshire, Lancashire, and South Wales defective in management, and opened out "without due consideration of future requirements."

Referring to explosions and the use of the safety lamps, he noticed a want of care, in many instances leading to danger; and observed truly, that the Davy, unless used "under strict regulations, becomes a source of danger from the mistaken confidence it produces." After describing the effect of an explosion, when all the stoppings and brattices are blown down or torn to shreds, he remarked that these facts "point out the strong necessity for two independent shafts in all coal mines." He also reverts to one great evil of defective ventilation, namely, the diseases which injure and destroy more lives than the explosions. The report concludes with the following observations:—"In reviewing the causes of the explosions in mines, of which the attendant circumstances can be ascertained, it must be admitted that the greater part have been the result of a clearly defective system of working and ventilation," and that "a well-considered system of rules and general directions for the guidance of the workmen is highly important to the security of a colliery."

Professor Phillips, in his report, gave a minute description of the underground workings and different modes of cutting and raising coal, and then dwelt on ventilation and the modes of producing currents of air underground. At that time the motive power generally adopted was the furnace, placed at the bottom of the upcast shaft. In the North of England a different system, namely, the steam jet, had been introduced at only one colliery, the Seaton Delaval.

The largest quantity of air then passing through any colliery in the United Kingdom was 190,000 cubic feet per minute, at the Hetton colliery, and the

swiftest current was 1740 feet per minute at the Haswell colliery. The ventilating power of the furnaces was much greater than the result obtained, owing to the length, smallness, and irregularity of the underground air ways. The ventilation of the northern collieries was found to be satisfactory; so much so, that the Professor reported that "the great majority of the collieries in the districts of the Tyne, Wear, and Tees may be confidently pronounced to be now safe for men to work in, with candles in the whole mine, with lamps in the broken, *under ordinary circumstances*." However, the list of accidents shewed results not in accordance with the Professor's views. Referring to the increase of explosions since the introduction of safety lamps, he gives a list of fourteen explosions, and remarks that "thirteen out of the fourteen explosions have occurred in the whole mine, where candles are used; that is, where pillar working had not commenced, and consequently no lamps were used." The increase in the number of accidents is ascribed to the augmented depth, increased area, and larger output of modern collieries. The ventilation of the Midland collieries was not found to be so good, and in the Yorkshire collieries it would be difficult "to obtain above 5000 cubic feet of air in a minute." Summing up the great necessity for improvement, and the best means of obtaining it, Professor Phillips remarked: "It is not so much by other modes of working, new systems of ventilation, or more ingenious safety lamps that danger is to be warded from a mine, as by superior skill and unsleeping vigilance in administering the best methods already known, so as to prevent the concurrence of

the physical and artificial elements of danger;" and in order to obtain the necessary skill and vigilance he considered that "a systematic inspection under the authority of Government appears desirable." In fact, all the official reports to Government and the recommendations of select committees, as well as a flood of pamphlets and other documents, supported the establishment of a Government mine inspection in some form or other. Thus pressed on all sides, and armed with ample information, the Government determined on framing a measure to carry out the principle of inspection, which was introduced in the House of Lords on the 11th July, 1850, by Lord Carlisle. The new measure was principally directed to two points, namely, the inspection of the collieries and the requirement of correct plans, the expense of carrying out the provisions to be charged to the Consolidated Fund, but the responsibility of management to rest entirely with the owners. The opposition to this moderate Bill was not great, although the Marquis of Londonderry, always a determined foe to mine inspection, protested "against the Bill as the most mischievous and unjust measure that could possibly be imagined."

It is strange to have to record that Lord Brougham considered this measure as an "unjustifiable interference with the rights of labour," although avowedly framed for the protection of labour, and not only with the approbation of the colliers, but almost at their instance, and in consequence of their prayers. It soon passed through all the forms of Parliament, eliciting but little comment. The Act provided for the appointment of inspectors, with authority to enter into and

examine any colliery underground, as well as all the works, machinery, and buildings on the surface, at any time, and enquire into all matters relating to the safety of the men employed. In the case of danger existing, the inspector was to point out such danger to the manager, and if the defect was not remedied within a reasonable time to report the case to the Secretary of State. Colliery proprietors were required to give notice of the occurrence of fatal accidents to the Secretary of State within twelve hours of the event, and coroners to give two days' notice before holding inquests. A penalty of not less than £10, or more than £20, was imposed on colliery proprietors for neglecting to give due notice of such accidents. They were also to cause correct plans of their works to be made and maintained, and to produce them to the inspectors when required; and for obstructing the latter in the execution of their duties, a penalty of not more than £10, or less than £5, was provided. The Act was to remain in force for five years from the date of passing, and then to the end of the then next session. The Act of 1842 was not repealed, and all its provisions remained in force. Thus the collieries of the country were placed under two parallel species of inspection—one having for its object the condition of the population in the mining districts; the other, the workings and safety of the mines. The inspector or commissioner appointed in 1842 continued his labours, and presented annual reports dealing exclusively with social questions affecting the workpeople. In fact, his instructions on appointment had been to inquire into, and report on, the general condition of the persons employed,

and on the manner in which the Act was observed, but not to descend into the mines or enter into questions regarding their safety. The period of preliminary inquiry had now passed by. The condition of the collieries was thoroughly recorded in numerous reports and official documents, and it was anticipated that by the introduction of a system of organised inspection many existing evils would be removed and a saving of life effected.

CHAPTER V.

GENERAL OPINION ON THE ACT OF 1850—APPOINTMENT OF INSPECTORS—AGITATION AMONG THE COLLIERS FOR MORE INSPECTION—CONDITION OF THE COLLIERIES—ACCIDENTS IN VARIOUS DISTRICTS—COMMITTEE OF THE HOUSE OF COMMONS OF 1852—FOUNDING OF THE INSTITUTE OF MINING ENGINEERS IN THE NORTH OF ENGLAND—COMMITTEE OF THE HOUSE OF COMMONS 1853-54—REPORTS OF THE INSPECTORS—THE ACT OF 1855.

THE Act of 1850 did little else than establish the principle of underground inspection. The innovation was received with more or less dissatisfaction by the colliery proprietors. They objected to a system which authorised a Government official to pry into the management of their works, and dreaded the possibility of an interference in their trade. Some opposed inspection on those grounds; others feared that the Government inspectors would be scientific men, who might recommend alterations impossible to carry out or ruinously expensive. They feared the possibility of being advised to place miles of cast iron tubes in their pits to draw off the inflammable gas, or to put down innumerable boreholes from the surface to drain it away from the goaves. Many of the colliery managers opposed inspection as a useless institution, especially if it was to be carried out by scientific men. Among these persons a belief prevailed very generally that only those who had from early days been accustomed to pit work could ever thoroughly master the intricacies of underground workings—a mistaken opinion arising out of the exclusive life of all engaged in colliery working, from the viewer or manager down to the trapper. However, if the colliery owners and managers were

averse to the new Act and to inspection, the colliers, on their side, were satisfied with the change, and anticipated good results. The pitmen in the north of England testified their thankfulness for the measure by presenting Mr. James Mather, the honoured secretary of the South Shields Committee, with a silver cup, in recognition of his exertions in promoting legislation to diminish the dangers of mining. It is pleasing to record this tribute of appreciation to one whose labours in the cause of humanity in reference to colliery accidents are second to none other.

Some curiosity was not unnaturally expressed as to the kind of men who were to be appointed as inspectors. The apprehensions of many colliery owners were relieved by finding that the new inspectors were all men practically conversant with underground workings. The first inspectors were Mr. Blackwell, who had been engaged in making reports for Government; Mr. Dunn, a mining engineer who had for years advocated Government inspection; and Messrs. Dickinson and Morton, also mining experts. A letter of instructions was sent to these gentlemen by Government, on their appointment, in which they were requested to attend every inquest and enquire into the causes of the accidents; to examine the workings, and ascertain what measures could be adopted to prevent a similar occurrence; on the other hand, they were most pointedly cautioned against any interference with the actual management of the collieries, in the following words:—"It is no part of your duty to enforce any particular mode of ventilation or of working. The responsibility in these respects must rest on the owners and managers of coal mines."

The Government had met the views of the colliery proprietors in limiting the powers and duties of the inspectors, who were really little more than scientific assistants to the coroners, and charged with simply recording the number of fatal accidents in their half-yearly reports. But even this restricted inspection was capable of being of some use. At any rate, the accidents were to be thoroughly examined into, and, if possible, their causes ascertained and recorded, and a correct register was to be kept of the number of lives lost in the coal pits of the Kingdom. In addition to this, great benefit was anticipated from the systematic record of the conditions of the colliery workings in the different districts. The reports of the inspector appointed under the Act of 1842 gave a clear and truthful description of the general condition of the mining population on the surface; but his powers did not extend to the underground workings, and the question of saving life did not come within his province. In fact, the inspector under the Act of 1842 had but insufficient power to enforce its provisions, so much so that it was constantly evaded, and that even as late as 1851 women and girls were to be found underground in the coal pits of South Wales. The new Act was much more stringent in its provisions. The inspectors were armed with full powers to examine the colliery above and below ground, and could enforce observance of the clauses of the Act by proceedings at law, when fines might be inflicted on the owners and imprisonment on the workmen for any breach of the Act. But at first the inspectors found it no easy matter to obtain convictions before the county magis-

trates ; as a matter of fact they had difficulty in securing evidence to prove their cases, and in general the prosecutions under the Act were most unpopular. The importance and powers of the inspectors were much over-rated at first by many of the smaller colliery proprietors. The effect of this mistake was to some extent beneficial, as a general sweeping and brushing took place in all the colliery districts. Hitherto, the underground workings had been carefully closed to all intruders, and were known only to the owners and their overmen ; now they were to be thrown open to the scrutinizing eye of a vigilant inspector. It was therefore needful to put matters in some order for the expected visit of the official. However, this visit did not take place so soon as had been anticipated. Month succeeded month, and one year followed another, yet no mines' inspector ever made his appearance at a colliery, unless summoned there by some fatal accident. This species of inspection, while it satisfied the owners, who soon resumed their old ways, did not meet the expectations of the working colliers, or of those who looked to inspection for improvement in the management of collieries and a diminution of fatal accidents.

A fresh agitation now commenced. The question began publicly to be asked—Where are the inspectors ? In answer to this, it was urged that the number of inspectors was too small to enable them to visit all the collieries within anything like a reasonable time. The number of collieries in England and Wales was at that time, 1851, estimated at 1200, so that to examine every colliery once a year every inspector would have to visit 300 mines—a labour practically impossible. It so

happened that during the year following the introduction of the Inspection Act, a great many serious accidents occurred. An explosion happened at Nitshill Colliery, near Paisley, by which sixty-one men and boys were killed; another at Workington, where thirty-five lives were lost; and one at Rawmarsh, causing fifty-two deaths, besides a number of lesser accidents. Instead of diminishing, these occurrences seemed to be on the increase since the Act had been introduced. When the reports of the inspectors for the year were published, it was found that in 1851, the number of recorded deaths through accidents at the collieries amounted to 1062, this being the first truthful record of lives lost in collieries for any definite period. The reports of the inspectors gave an insight into the condition of the collieries at that time. Mr. Matthias Dunn, referring to the northern district, found the Scotch collieries "much inferior in management to the English," but was glad to notice that at almost all collieries plans, though sometimes defective, were kept.

Speaking of the explosion at Workington Colliery, he pointed out that it appeared, from the evidence at the inquest, that the colliery had been in a dangerous condition for some time, and that some of the colliers had actually refused to descend the mine; they had not, however, communicated their fears to the Government inspector. Mr. Dickinson, reporting on the Midland counties district and North Wales, returns a list of 282 deaths in the 740 collieries under his inspection during a period of eight months. Many of these accidents were caused by carelessness. At Haydock Colliery an explosion occurred, killing four men, through an air-door being propped open. At Bignall

Hill there was no artificial ventilation at all, and three men were blown up. At Heys six men perished through defective ventilation, the air-ways being quite impassable. The Bent Grange Colliery, near Oldham, had to be stopped altogether; and the inspector said in his report, that "the circumstances under which the colliery is at work are so exceedingly dangerous, that beyond urging upon the proprietor the necessity of suspending operations until the ventilation can be arranged, I have not dared to hazard any suggestion." The practice of "burning out" the gas was then common in Lancashire. This consisted in setting fire to the accumulated gas in the drifts every morning before beginning work. The fact of this burning evidently shewed a very insufficient ventilation. The means employed in the Midland districts to produce the ventilating currents were insufficient. In the Staffordshire shallow mines it was usual to place a small grate in the side of the upcast shaft, in which a fire was irregularly kept up by throwing a few lumps of coal occasionally into it from the skip. In some mines not even this primitive attempt was made; and in nearly all the collieries the air-ways were too small, often quite neglected, and sometimes allowed to collapse entirely. Many other evils existed which led to danger and actual loss of life. In Staffordshire, where the coal was worked at shallow depth, numberless disused pits were left unfenced, to the imminent danger of the passer-by; so much so, that the inspector observed that "no collier or other person was safe in traversing the neighbourhood after nightfall." In the Yorkshire district matters were no better. Collieries were worked without any artificial ventilation; safety

lamps in use with gauges having only 550 to 600 apertures to the square inch instead of 780; bratticed shafts, at most collieries; and the whole under loose and unsatisfactory management. The condition of the collieries as recorded in the inspector's report for 1851 was not satisfactory. But a sincere desire to improve matters was springing into existence. Both practical and scientific men were turning their attention to the subject of ventilation of mines and of preventing explosions. The relative value of the furnace and the steam jet, as the motive power for ventilating currents, was especially much discussed about that time. The merits of mechanical appliances were advanced by Mr. James Nasmyth, who constructed an improved ventilating fan. A great step towards better distribution of knowledge among mining viewers was made by the inauguration of the School of Mines, at the Museum of Economic Geology, on the 6th November, 1851, by Sir Henry de la Beche. A general and deep interest began to be taken in this hitherto discarded or unnoticed branch of industrial labour. The outcry for more inspectors induced the Government to appoint two additional, one for Scotland and one for England; but this was not sufficient to satisfy the working-men. Early in the year 1852, namely in February, the miners of Durham and Northumberland presented a memorial to the Home Secretary, expressing their gratitude for the attention already given to the subject by Her Majesty's ministers, but humbly praying that a measure be introduced providing for more inspection, better ventilation, and an increase in the number of shafts. This memorial was justified, as it were, by the succession of explosions which

occurred at the time. Early in May, ten men were killed at Morely Hall; on the 6th, twenty-two at Hebburn; on the 10th, sixty-five at Middle Duffryn; on the 20th thirty-six at Coppul; and on the 5th of June, five men at Bunker's Hill Collieries; so that in little more than three weeks 138 lives were lost in colliery explosions. After the explosion at the Coppul Colliery, Mr. Cayley, the member for the North Riding of Yorkshire, referring to this and other accidents, moved for a select committee of the House to enquire into the cause of these occurrences, with a view to their prevention or reduction. The committee was appointed, and met for the first time on the 27th March. They presented their report in the following June. In the course of this investigation they directed their attention more especially to the subject of ventilation, and endeavoured to ascertain which system of artificial ventilation was the best and most generally applicable. The report commences by asserting that the prevention of explosions must be obtained by better ventilation; and the committee were "of opinion that any system of ventilation depending on complicated machinery is unadvisable, since under any derangement or fracture of its parts the ventilation is stopped, or becomes less efficient." They considered "that the two systems which alone can be considered as rival powers are the furnace and steam jet." The latter system was strenuously advocated before the committee by Mr. Goldsworthy Gurney, and supported by Mr. T. E. Foster, who had obtained good results with it at the Seaton Delaval Colliery. The evidence in favour of the steam jet was so convincing to the minds of the select committee that they recommended it above

all other modes of ventilation in the following words :
“ Your committee are unanimously of opinion that the steam jet is the most powerful, and at the same the least expensive, method for the ventilation of mines.” Neither the evidence nor the results obtained were sufficient to carry the same conviction to the minds of colliery owners or managers. The committee also gave an explanation of the cause of the frequent recent explosions, which was based on slender facts. They attributed these accidents to the increase of ventilation in collieries. Assuming that carburetted hydrogen requires seven to eight times its volume of common air to bring it to the explosive point, the committee observe that “ the introduction of an insufficient quantity of air into a fiery mine may cause the very mischief against which it is intended to guard.”

In order to ascertain the relative value of safety lamps, and more especially the Davy lamp, they adjourned to the Polytechnic Institution, where a series of experiments was made with different lamps under varied circumstances. These trials led them to doubt the perfect safety of the Davy, and they remarked that “ where a proper degree of ventilation does not exist in a mine, the Davy lamp, or any modification of it, must be considered rather as a lure to danger than as a perfect security.” The committee considered it better to remove the danger of explosion by efficient ventilation than endeavour to evade it by the use of a mechanical invention, such as a lamp liable to disarrangement in the course of practical use underground. “ Nevertheless,” says the report, “ in a mine that is at all fiery it will be a prudent precaution

to work with a lamp until it can be proved that, by means of ventilation, a mine can be so far cleared of all explosive gases as to prevent any accumulation of them in the workings, goaves, or elsewhere." Leaving the subject of ventilation, the committee refer to the objectionable practice of employing boys in responsible positions underground. They also point out the short notices generally given by coroners of the inquests held after fatal accidents, and suggest the expediency of having a special coroner. They refer to a letter from Sir Henry de la Beche on the necessity of better education, more particularly among managers and overmen; and they "not only trust to see education more rapidly spreading than heretofore among working colliers, but schools of mines established, without certificates from which no overman, underlooker, or manager shall be legally appointed to his office." The inspection, such as it then existed, was considered wholly inadequate. The "numbers were too small, its powers too limited." The number of inspectors at the time was six, and the committee recommend twice that number, with two sub-inspectors added to each chief inspector. They also recommended a central board, composed of scientific and practical men, to whom the inspectors might report, and from whom they would receive instructions from time to time. Without advocating a great increase in the powers of the inspectors, they recommended that they should be empowered to stop the workings of any colliery where great danger evidently existed, if the owner refused to adopt some approved mode to attain security. In conclusion, they felt "disposed to trust to the appointment of an efficient

and vigilant board; to an increased number of well qualified inspectors and sub-inspectors, who should practically have the power of enforcing such a rate of current of air through the various parts of the mine, as in their judgment the safety of the miners required; together with the adoption in each mine of such scientific instruments as both preserved a register of ventilation and gave warning of danger; that such powers should extend to inflicting penalties for the non-possession of such instruments and non-attention to the precautions recommended, and to stoppage of the mine until the right measures were taken." Some of the suggestions contained in this report were received with extreme surprise. The strong recommendation of the steam jet as a ventilating power led to a series of experiments in different parts of the country, but more especially in the north of England. The suggestions of boreholes for ventilating goaves did not meet with approval from any one conversant with collieries. The necessity of more education among the overmen and the colliers, and the desirability of increasing the number of inspectors, were more readily admitted. But the proposed additional powers with which the inspectors were to be invested, and the establishment of a central board, were not favourably received. The impression which the report of the select committee produced may be gathered from the observations made by Mr. Nicholas Wood, in his address inaugurating the Institute of Mining Engineers of the North of England, on the 3rd September, 1852. He said: "This committee has made various suggestions, some of them of a startling nature, both as regards

the practicability of their adoption and their utility in accomplishing the objects for which they are recommended; and certainly great doubts exist as to the propriety, as well as the efficiency, of several of their suggestions as regards the ventilation of mines." These observations may be accepted as expressing the opinions of the majority of the viewers in the north of England. Although the recommendations of the committee of 1852 were not such as to meet with much favour, the report was useful in drawing attention to many subjects on which evidence had been given, and stimulating enquiry. The surprise felt at the prominence given to the steam jet as a ventilating power, and the anxiety thus created among colliery proprietors, led the Government inspectors to investigate the ventilation of the Seaton Delaval Colliery, where the steam-jet had been adopted, and where it had been reported to be so successful. They made a report containing the details of numerous experiments, which were not, however, in favour of the steam jet, but went to prove that the ventilation of the colliery was mainly due to the elevation of temperature of the upcast shaft caused by the boiler fires and gas apparatus placed underground. Mr. Dunn, the inspector of the district, who assisted at these experiments, observes in his report:—"With respect to the steam jet, I feel warranted in asserting that, as a general measure, it will not stand a comparison with the furnace." Experiments were also made at the Arley Colliery, and others in Lancashire, and the result of these may be given in the words of Mr. Joseph Dickinson, the inspector of that district. He said: "In ordinary circumstances

where economical and powerful ventilation is required, so far as my own experience shows, the furnace system appears to stand unrivalled." All the inspectors, in their remarks on the suggestion of the select committee, agreed in condemning the compulsory adoption of any particular system of ventilation. Indeed, about this time mechanical ventilation was beginning to be introduced. At the Westminster Colliery, in North Wales, and at Middle Duffryn, in South Wales, air pumps on Mr. Struvé's plan were in operation in 1851; and in the following year a ventilating fan was erected at the South Mostyn Colliery. It would, indeed, have been highly impolitic to hamper the colliery proprietors by imposing on them any particular ventilating system at a time when they were endeavouring to improve the ventilation of their collieries by trials of different systems, and adopting those best suited to the special circumstances of their pits. Among other efforts to improve the collieries must be classed the formation of a society for the prevention of accidents in coal mines, at Newcastle-upon-Tyne. A meeting of colliery owners and viewers was held for this purpose in July, and a committee nominated to draw up a set of rules. This movement led to the founding of the "Institute of Mining Engineers of the North of England," which was inaugurated on the 30th September, 1852, for the purpose of promoting the theory, art, and practice of mining, and which has proved itself a most useful institution by the value of the contributions and the discussions held on them.

In the inaugural address already alluded to, Mr. Wood referred to the colliery explosions, and said :

“The number of accidents or deaths from explosions in the counties of Northumberland and Durham, we find for sixty-five years previous to 1815, or when candles were used, was 774, while in thirty-five years afterwards the number was 968, with the use of the safety lamp ; and we have the more appalling fact that since November, 1850 (the commencement of the Act for the appointment of Government inspectors), the number of deaths by explosions has been at the rate of 250 per annum.” The conclusion which might be inferred from this statement would be erroneous, as the statistics of the number of deaths through colliery accidents previous to the appointment of inspectors are incomplete. It was a matter of notoriety that previous to 1815 inquests were seldom held on the bodies of those who lost their lives in collieries ; and that in subsequent years the registers of parishes were defective, seldom recording the cause of death, so that it was impossible to compile a trustworthy record of deaths. Nevertheless, it was evident that the number of fatal colliery accidents seemed to shew no diminution, and by some persons no improvement was anticipated from the system of inspection recently instituted. On the other hand, more hopeful opinions were entertained by many competent engineers and colliery owners. In a paper read before the Society of Arts in 1853, Mr. Blackwell attributes “the real, the primary cause of accidents to the bad condition of the mines, which admitted of a casual act of carelessness leading to an explosion ;” and Lord Wharncliffe, who presided on that occasion, remarked that “inspection had this especial good, it had called attention to persons who were careless, and it had helped to

spread the best information throughout the country; and he trusted that the result of the awakened and continued attention to the subject would be a decrease in the lamentable accidents from colliery explosions." This opinion was shared by the working colliers, who continued the agitation commenced a few years previously for more inspection, with the conviction that thereby fewer lives would be sacrificed through bad management or carelessness. But their idea of inspection did not coincide with that of the colliery owners and managers. They desiderated to see sub-inspectors selected from their own class, with whom they could be on terms of sufficient intimacy to confide their fears and apprehensions of danger. They also wanted to invest the inspectors with full authority to order any alterations which they might consider needful for the greater security of the mines, in fact, to invest them with the responsibility of management. It is remarkable that from the time that the colliers adopted the principle of inspection, which was, in fact, from the date of its introduction, they desired to see the inspectors invested with the powers of management. It showed the wide-spread want of confidence which these men had in the officers of the collieries.

This feeling was only too frequently justified by the disclosures made at the inquests or by the enquiries following serious accidents. An amount of ignorance or incapacity was then often brought to light such as would not have been tolerated in any other pursuit. But the idea of having sub-inspectors appointed from the overmen class was not an advisable one, on the ground of the difficulty of finding suitable men, if for no other reason. The recommendation of the select

committee of 1852 did not come up to the expectations of the workmen; in fact, the report was unsatisfactory to all parties, and the subject was brought again before the House of Commons at an early date. On the 15th February, 1853, a return of the number of accidents in coal mines during the years 1850—51, and 1852 was moved for. The inspectors compiled a list of accidents from November, 1850, up to December, 1852, shewing that during that time 2040 lives had been lost in colliery accidents. This return gave Mr. Hutchins the opportunity of moving for leave to nominate a select committee on accidents in coal mines, which was agreed to by Lord Palmerston, then Home Secretary, who considered the question one of great interest and worthy of being enquired into. A long list of subjects for enquiry was prepared, including effective ventilation, comparative efficiency of the steam jet and furnace, distribution of air-ways, construction of upcast shafts, improvement of safety lamps inspection of mines, and education of the mining population. The inquiry into these different matters occupied the committee during two sessions. They commenced their labours in June, 1853, and completed the report in the same month in the following year. They reported progress from time to time, and the greater part of the evidence was printed before the report was laid on the table of the House of Commons. The enquiry caused considerable excitement among all classes connected with the colliery interest. The questions to be enquired into were of paramount importance, and it was essential to have them deliberately and completely discussed. The owners and viewers were desirous of refuting the startling

suggestions of the last committee, the workmen were clamorous for extended inspection, and the Legislature, as well as the public, alive to the fact that colliery accidents were still both too frequent and too fatal, hoped that some means for diminishing them might be arrived at. The select committee of 1852 had hazarded an explanation as to explosions, attributing them in many instances to an increase of air in the pits; yet every petition from colliers, and every allusion to the subject by competent men, suggested improved ventilation. Although inspection existed, it was more in form than in fact, and the mines were seldom visited by the inspectors; convictions under the Act were very rare; and the only tangible result which had been thus far obtained was a record of the number of deaths annually, which amounted to a thousand on the average. During the sitting of the committee delegations and deputations arrived from all parts of the country, representing different interests. Colliery owners and their representatives, viewers and engineers, and workmen's delegates formed committees to deliberate and discuss the evidence to be given, or press their views on the Government. A deputation consisting of workmen's delegates waited on the Home Secretary on the 26th July to urge the framing of a measure of relief during the session; to advocate the appointment of sub-inspectors; compensation to the widows of those who perished by accidents; a special coroner; and some minor points. Lord Palmerston promised to give his best attention to the subject during the following session, when the report of the select committee would be completed and the matter fully considered. De-

monstrations of colliers were also held in the different districts, and numerous petitions sent up to the Houses of Parliament or the Home Secretary. The burden of all these documents was similar. The prayers always included greater protection of life by improved ventilation ; more shafts on large winnings ; a system of education such as had been provided for factory children ; and increased inspection. They pointed out the numerous accidents recorded, and the difficulty of frequent communication with the inspectors, owing to the extent of the districts and the number of pits under their charge. Mr. Dickinson, in his report for 1853, stated that in his district there were no less than 879 coal pits. The results effected by the Act were not so great as had been expected. Although some of the inspectors trusted that the feeling of emulation created among the colliery owners and managers would lead to a general improvement, others reported a much less hopeful state of affairs. An explosion occurred at the Risca Colliery during the year, and the inspector on examining the workings found them to present the same dangers and defects which had been pointed out some years previously by Sir Henry de la Beche, who reported on the condition of the colliery after the great explosion in 1846. Mr. Mackworth, in reviewing the working of the Act in his district, South Wales, said : " I have little expectation of being able to prevent, without other assistance of a penal kind, the effects of that cold-blooded apathy which disregards the lives and limbs of human beings." He found many collieries without plans, the discipline lax, and the management insufficient, and a great difficulty in obtaining

competent juries, as most of the persons summoned could neither write nor read. In discussing the management of collieries, the inspectors had drawn attention to certain codes of rules adopted at many large collieries and recommended the practice. The select committee, adopting the suggestion, requested the colliery owners to frame a set of rules for the guidance of all employed at collieries, which might be incorporated in any act which the Legislature might pass on the subject. In consequence of this the committee of the Coal Trade Association of Northumberland and Durham held some meetings, and eventually issued a circular on the 25th of March, 1854, to the principal coal owners in the country, convening a meeting of coal owners and engineers to consider some resolutions approved by the Association. In this circular they intimated that it was desirable to bring under the consideration of the committee of the House of Commons, now sitting, a code of regulations for the inspection of mines so constructed as to be applicable to the mining districts of the country generally. In order to carry out this object deputations from each district were solicited to assemble in London on the 25th April, and the four following days, for the purpose of endeavouring to construct a general and comprehensive code of inspection. A very large and influential deputation from the different coal districts attended in answer to this summons. The meetings were held under the presidency of Mr. Nicholas Wood, and the inspectors were requested to attend, as well as a deputation of working-men then in London. After a series of meetings and a great deal of discussion, a list of rules was agreed on, and handed into the committee

by the chairman. The committee also obtained evidence from the workmen, delegates, and from other witnesses on this subject. During these meetings of deputations the views of the working colliers had been ascertained through their delegates. They were substantially as follows :—

Firstly : The appointment of sub-inspectors, to be practical men of the class of under-viewers. Secondly : A board of control, to judge between inspectors and colliery managers ; to act as court of appeal and appoint inspectors and sub-inspectors ; to examine colliery viewers and grant them certificates of competency before allowing them to practise, and generally to control the working of the Act of Parliament. Thirdly : Provisions to be adopted for the education of boys. And lastly : Better ventilation.

In order to ascertain the views of colliery owners, circulars were issued containing certain points for consideration, to which answers were requested and in most cases received. The inspectors embodied their views in a report, and the consideration and discussion of these opinions enabled the meeting eventually to arrive at certain conclusions, to the effect that a code of rules on the subject of prevention of accidents be provided at each colliery ; that additional inspectors were unnecessary ; but that if such appointments were made they should be persons of sound practical knowledge, and not less than ten years' experience in the management of collieries ; that it would be inexpedient to give the inspectors power to interfere with the system or details of working the collieries ; that to confer on the inspectors any greater powers would entail the creation of one or more courts

of appeal, to which the proprietors might have recourse; that if at a coroner's inquest it should be deemed necessary that the masters be represented, the representatives of the deceased should also be represented; that adequate artificial means of ventilation should be provided in collieries; that as a large number of accidents arise from the ignorance of the miners, which might be reduced by their better education, the owners in consideration of this fact ought to take measures for providing schools; and, lastly, that the arrangements connected with benevolent funds should be left to the coal owners and workmen. The suggestions thus made by the deputations formed an important part of the evidence collected by the select committee. The evidence, generally, as to the best means of diminishing the loss of life in collieries shewed great diversity of opinion. Some depended on the application of scientific and mechanical appliances, improved ventilation, compulsory use of safety lamps in fiery mines, and improved machinery; others, attributing the generality of accidents to bad management, desired to see improvement in the systems of working, strict discipline underground, more careful supervision, and better educated managers and overmen. A great amount of evidence was also given regarding the rival claims of the steam jet and furnace as motive powers for ventilation, and the subject of education was also minutely examined into. The report was presented in June, 1854, and contained an epitome of the evidence collected. Almost the first paragraph attributed the occurrence of explosions to defective ventilation. "The committee are of opinion that imperfect ventilation is the cause of the numerous

accidents from fire damp in the country, and that an abundant supply of pure air properly distributed must be considered as the great and effectual means of preventing explosions and the consequent sacrifice of human life." After enumerating the various means of producing the necessary currents of air, they "have to report that the preponderance of evidence is decidedly in favour of the furnace." It was, indeed, impossible, with the important, weighty evidence before them, to arrive at any other conclusion. The short-lived triumph of the steam jet had come to an end, though not without effecting some good; and the committee did not "fail to observe that the controversy which had been going on respecting the merits of the furnace and steam jet systems has had very beneficial results, and has produced an emulation which has been the means of improving ventilation in many districts, and of developing the merits and the powers of each system to an extent not before known." The committee came also to a clear and decided opinion as to the advisability of splitting the currents of air underground when a mine is extensively opened out, and the necessity of maintaining the air-ways so as to "allow the person in charge of them to pass through without difficulty." But referring to the ventilation of the goaves, they found the opinions so contradictory that "they are unable to discover any preponderance of evidence on the subject; but they are of opinion that to make boreholes from the surface would in many cases be impracticable, and, even when practicable, would not be attended with satisfactory results." Then, as to safety lamps, they consider "they should not be relied upon for the prevention of explosions," although

useful in mines liable to sudden outbursts of gas, basing this opinion on the experiments made by Messrs. Wood and Elliot with all the lamps then known, and with gas taken from a coal mine. The use of gunpowder they admit, after weighing the evidence: "Although the utmost care is necessary, it would not be advisable to pass any law prohibiting its use." Then, coming to the subject of inspection, the committee recommended: "That the number of inspectors be increased; that their salaries be augmented; that, under no circumstances, should they be allowed to attend to any business but that connected with their duties as inspectors of mines; that no new inspector be appointed who has not had at least seven years' experience as the practical manager of a mine; that, as soon as practicable, every person before his appointment as an inspector be subjected to an examination in all the branches of science connected with mining; that the reports of the inspectors be laid periodically before Parliament." The desire of the working colliers for sub-inspectors was not recognised; but the language of the report was unequivocal and strong in condemning the system of the butties, or petty contractors, of the Midland counties. After noticing the desirability of securing a requisite amount of knowledge in coroner's juries, and a point of law as to the recovery of compensation by the representatives of persons killed by accident, the committee gave a list of twelve rules which they recommended to be enforced by the Legislature, founded on the evidence and the report of the proceedings of the conference of owners and viewers of collieries.

The last subject touched on in the report was that of education; no particular plan was recommended; but the words of Dr. Horner, inspector of factories were quoted, who, in one of his reports, remarked: "If ever the boys between ten and twelve years of age who work in coal-mines should be required to attend school, as the people in Durham and Northumberland seem to desire, I hope the half-time system, and not the print-works system, will be applied to them;" and the committee then dismissed the subject with the remark that "many objections, however, were made with regard to the practicability of carrying either of these plans into effect."

Such was the substance of the report of the select committee of the House of Commons of 1853. Although tolerably exhaustive and more comprehensive than the previous one, there were some important points not alluded to at all which had been the subject of great discussion out of doors, and on which evidence had been given. No mention was made of the advisability of two independent shafts to each colliery winning, nor as to giving certificates of competency to managers and overmen, nor the appointment of a central board of control. Still the report, with the evidence and appendices contained in two large Blue Books, formed a valuable collection of information for the use of the Government in framing any contemplated measure. The report of the inspectors for the year 1854 also furnished information on the actual condition of the collieries in the different districts. The number of deaths during the year through colliery accidents amounted to 1017, or about the average since the existence of inspection. One

very serious explosion occurred at the Arley pit, near Wigan, causing the deaths of eighty-nine men. This colliery was very fiery and difficult to ventilate, owing to the coal being wrought to the rise of the shaft bottom. Safety lamps only were used in the workings, but shots were allowed to be fired by special persons. The cause of the accident was attributed to the firing of a shot in a place charged with inflammable gas.

The increase of accidents in some districts was attributed by one of the inspectors to the brisk state of the trade, which induced the owners to press the underground labour beyond the limits of safety in order to raise a sufficient quantity of coal to meet the demand. Several of the inspectors strongly recommended that a code of special rules should be enforced at every colliery, framed so as to meet the requirements of their particular circumstances. This recommendation was adopted by Government, and formed a clause in the Bill which they proposed, and brought before the House in May, 1855. It is curious that the measure was not discussed in either House from the date of its introduction until it received the Royal assent, on the 14th of August, 1855, except in committee, when it was but slightly altered. The most important feature of the new measure was a clause specifying seven general rules to be observed at all collieries. These rules were founded on those suggested by the conference of coal owners and mining engineers, and embodied in the report of the select committee. Another clause provided for special rules to be framed and put in force at every colliery, subject to the approval of a principal Secre-

tary of State. The duties of the inspectors were more clearly defined.

“If such inspectors find any of the special rules established for such coal mine or colliery to be neglected or wilfully violated, such inspector shall forthwith give notice in writing thereof to the owner or agent of such coal mine or colliery;” and for enforcing the observance of those rules, clause eleven provided that the owner or responsible agent shall be liable to a penalty “not exceeding £5, and a further penalty, not exceeding £1, for every day during which the offence continues after such notice.” Power was also given the inspectors to compel colliery owners to have correct plans of their workings, on a scale of not less than two chains to the inch. The notices of accidents were now to be given not only to the Secretary of State, but also to the inspectors, within twenty-four hours of the occurrence; and the coroners were to adjourn the inquests to enable the Secretary of State to be represented at the enquiry if considered advisable. The penalties for breach of the Act were not severe. The owners were liable to fines not exceeding £5, and £1 a day until the law had been complied with, after notice from the inspector. The workmen, however, were not only liable to a penalty of £2, but “to be imprisoned, with or without hard labour, in the jail or house of correction for any period not exceeding three calendar months,” for neglecting or wilfully violating any of the special rules established at any colliery. This clause was added by the House of Lords in committee, and was received with great dissatisfaction by the working men. The inconsistency of making

them liable to imprisonment for an offence under the Act, while the masters could only be fined, was not unnaturally the subject of much bitter animadversion.

The object of this stringent penalty was to enforce as much as possible the observance of the special rules, on which so much of the safety of the collieries underground depend.

CHAPTER VI.

THE ACT OF 1855--COLLIERY ACCIDENTS AND EXPLOSIONS--
PETITIONS FROM THE MEN FOR MORE INSPECTION--DISCUS-
SIONS IN PARLIAMENT--ACT OF 1860--HARTLEY ACCIDENT
AND ACT OF 1862.

THE Act of 1855 may not improperly be denominated a master's measure. It was mainly founded on the resolutions adopted at the meetings held in London, under the presidency of Mr. Nicholas Wood, and consisting of forty-nine owners' representatives, six mining inspectors, and four workmen's delegates. These resolutions represented the views of the party preponderating at the deliberations. The men felt specially aggrieved by the clause inflicting on them the penalty of imprisonment for a breach of the Act, whereas the employers were only liable to a fine. The inspectors objected to the clause directing the notices of accidents to be sent first to the Secretary of State before reaching them, and the clumsy arbitration clause was generally criticised. The Act, however, though not so comprehensive as it might have been, was a great step in advance of the previous one. By the introduction of general, and the enforcement of special rules, the responsibility of management became more defined, and the owners became accountable in the eye of the law for keeping their pits in a safe condition. The powers of the inspectors were enlarged, but without curtailing the responsibility of the owners. Shortly after the

passing of the Act six additional inspectors were appointed, and the coal fields divided into twelve districts.

The first effect of the measure was to cause meetings of owners in the different districts, in order to consider and frame codes of special rules suitable to the requirements of the collieries. In general, one set of rules was adopted by groups of collieries, working under similar conditions, within a given radius; but some proprietors preferred having sets of rules drawn up solely for their works, and then often sought to introduce irrelevant matter in them. They endeavoured to include rules regarding the price of labour, the payment of wages, or other contracts relating to the working of the pits. They even went further, for Mr. Dickinson, the inspector for the Manchester district, found that some of these codes, besides commercial rules, proposed to bring the force of the Act to bear on colliers who did not "attend Divine service at least once on the Lord's Day;" or even on the careless workman coming to his work "on a Monday morning dirty, or with an old beard." These were, however, exceptional cases, and in general the inspectors found little difficulty in carrying out the provisions of the Act within its meaning. All the inspectors, and a majority of the viewers, agreed in considering a properly framed set of rules, strictly observed, one of the greatest safeguards against accidents; and so general did the opinion prevail that the owners complied with this clause of the Act in a very short time. In other respects the Act was not so well observed, and the reports of the inspectors for the year 1856 shew that

it was frequently evaded or ignored. Mr. Higson found that the "violation of rules does not command that attention which the nature and importance of the offence demands," and he attributed this to the want of education, not only among the working miners but also among those having the management of collieries. Indeed, the necessity of better-informed managers was urged by all the inspectors and admitted by many colliery proprietors. In order to supply this deficiency, numerous proposals for the establishment of local mining schools were put forward. But few of these schemes, however praiseworthy, were destined to become permanently successful, and to this day most of our great mining centres are unprovided with the means of giving a sound and efficient education to young men who desire to enter upon the dangerous and responsible avocation of colliery manager. The prevailing ignorance of those in charge of collieries at that time was strongly brought to light by an enquiry which took place into the causes of an explosion at the Cymmer Colliery, in South Wales, which occurred on the 15th of July, 1856, and by which 114 lives were lost. This accident formed the subject of a question in the House of Commons, in answer to which the Home Secretary promised that a "thorough and searching investigation would take place." The enquiry which was held revealed a very bad state of affairs. The colliery appeared to have been grossly mismanaged, and the most ordinary precautions neglected. It appeared, from the report of Mr. Mackworth on the occurrence, that in 1852 he had cautioned the owners on the state of the ventilation, and had, from time to time, made suggestions and drawn up

rules to be observed for the safety of the colliery. These needful precautions, had, however, been disregarded. In fact, it came out at the enquiry that the manager seldom descended the pit, leaving the entire practical direction of so large and dangerous a colliery in the hands of an illiterate overman. The evidence of the neglect and of incompetency were so strong that the coroner's jury returned a verdict of manslaughter against the manager, the overman, and the firemen of the colliery. They were subsequently acquitted at assizes on technical grounds. This accident contributed largely to the total of 1027 deaths through colliery accidents during the year. Not many months after this calamity a still more disastrous explosion occurred at Lundhill Colliery, in Yorkshire, where, on the 19th of February, 1857, no less than 189 persons perished. The Lundhill Colliery was neither a small or neglected one. Every necessary precaution against explosion appeared to have been taken; the current of air in the mine was ample; safety lamps were provided for the colliers; a complete code of rules established. But such was the want of skill and the laxity of the management that the ventilating current was not brought to bear on the face of the coal; that the use of safety-lamps was left optional by the colliers; and that the rules were so disregarded as to be merely nominal. Several mining engineers of standing, who had been consulted as to the best steps to be taken to save life and property, gave evidence at the inquest; and Messrs. Wood, Elliot, and Woodhouse concurred in the opinion that the management underground was, in general, too lax; that the use of safety lamps in such a seam

ought to be universally enforced, and not left at the option of the wastemen, or road-packers, and that the mode of working the coal was defective and dangerous. The origin of the accident could not be clearly ascertained, despite the most careful and searching investigation. Perhaps the evidence of the under-viewer, who had previously acted as chief viewer for a time, may give a clue to the cause of the explosion. He said: "As regards the system of working coal generally, in this neighbourhood, I will venture to say, from my own experience in the north of England, in Staffordshire, and in Yorkshire, that the Barnsley mode of getting coal is the most wretched and the most dangerous that I know." But it required an explosion, killing 198 men, to bring this fact clearly before the minds of practical men.

Thus the jury, while condemning the lax discipline and faulty management of the colliery, relieved the owners of blame, and returned virtually a verdict of accidental death. This, though the most disastrous, was not the only serious explosion which occurred during 1857—a year conspicuous in the annals of colliery accidents through the number and fatality of explosions. The loss of life through explosions alone amounted to 377, out of a total of 1119 lives lost during the year. So far the results obtained under the new Act were not encouraging. Some improvement took place in the following year, during which 215 lives were lost by explosions out of a total of 931 deaths; and in 1859 the numbers were still further reduced to ninety-five out of an aggregate of 905 deaths, and this during a period of great activity in the coal trade. During this year the possibility of amending

the Act on its renewal in 1860 was much discussed. It was generally supposed that some alterations would be made, and probably a great many proposed. The inspectors met in London to consider what alterations they could suggest to improve the measure, and in the House of Commons, Mr. Ayrton, on the 12th August, asked "whether it was the intention of the Government to enquire into the effect of prolonged labour of children in mines of coal and iron-stone, as the Act for inspection of mines expired next year." He received a reply to the effect that an enquiry would take place, although it had not been determined whether or not by a commission. No Royal commission, however, was appointed, and no Parliamentary enquiry took place; but on the 14th February, 1860, the "Mines Regulation and Inspection Bill" was brought in and read a first time. During the previous year numerous suggestions had been made—in the press, at public meetings or scientific societies, and through other channels—as to alterations which might be made in the existing Act, or new clauses which might be introduced into the Bill. It was generally admitted, that although inspection had not realised the results hoped for by its more sanguine supporters, it had been to some extent beneficial, and, at any rate, had not in any way caused injury to the coal trade. Some had feared dangers of meddling or injudicious interference on the part of the inspectors; but their prudent line of official conduct had conciliated most of those colliery owners who had been adverse to inspection. It was universally admitted that, in the cases of enquiry into serious accidents, the services of the inspectors were invaluable. In fact, the points of discussion

rested not on the principle of inspection but on its greater or less extension. The inspectors themselves recommended placing the iron-stone mines, especially those connected with the coal fields, under the Bill.

The workmen, who had developed an increasing interest in the legislation affecting them, continued to press for an increase in the number and powers of the inspectors. They hoped for increased safety underground through having frequent visits by competent inspectors armed with powers to order any alterations they deemed necessary. They still laboured under the mistaken idea that the duty of an inspector ought not to be confined to merely examining the mines and recommending or suggesting alterations, but that he ought to have the power of ordering that which he might consider needful for the safety of the men. This was an erroneous interpretation of the intentions of the legislature. Besides the increase of inspection, the men also demanded that the coals wrought should be paid for by weight, and not by measure. Among the numerous suggestions pressed at the time was one proposing the creation of a minister of mines, either as a separate office or head of a department under the Board of Works, and this idea met with the support of the working colliers. The framers of the Bill seem to have considered all the suggestions made, and endeavoured to include within its scope enough to please the one side and not too much displease the other. It met with a fair, but by no means a cordial, reception on the part of the association of colliery proprietors. Some of these objected altogether to further legislation, and several clauses, especially those relating to the employment of boys, were generally disapproved. The

colliers, on their side, testified their approval by sending up to Parliament twenty-five petitions, signed by over 30,000 colliers, in favour of the Bill, supported by a deputation representing most, if not all, the colliery districts of the country. Several new principles had been introduced into the measure. In the first place, its provisions were extended to iron mines, thus recognising the necessity of protecting labour underground apart from the special dangers of coal working. The clauses regarding the labour of boys were extended, and an education clause introduced. It was provided that boys under twelve years of age were not to be employed underground, except those employed at the time of the passing of the Act, and such as were able to obtain a certificate from a competent master to the effect that they could read and write. Boys were, further, to furnish their employers with certificates, showing that they had attended school for twenty hours during each preceding month. The age of those entrusted with the care of steam-engines was fixed at eighteen instead of fifteen years. The general rules to be observed at all collieries was increased by one. The number of these rules first proposed was sixteen, but they were reduced to eight in committee. The special colliery rules already established were to remain in force, and provision was made for framing new ones. The powers of the inspectors were enlarged, and notices of death through accidents were to be sent direct to them within twenty-four hours of the occurrence, and not to the Secretary of State, as previously.

The Act of 1842 was repealed, except in so far as it related to the employment of women underground ;

and, as the office of inspector under that Act was abolished, the duty of reporting on the condition of the mines rested solely with the inspectors appointed under the new measure. It was fully expected that the measure would be opposed on the second reading. However, it was not until the Bill came before committee that the education clauses were attacked. Before this occurred, numerous petitions had been sent up to Parliament from colliers working in almost every district of the country expressing their views. They urged, among other points, the insertion of a clause providing for strict weighing of coal on the pit bank, and that notices should be given to the inspectors not only of the fatal accidents but also of those resulting in serious injury. The coal owners, on the other hand, were not remiss in waiting by deputation on the Home Secretary, and supporting their views by influentially signed petitions. In committee they made a determined attack on the education clauses, which they affirmed would injuriously affect their interests. The Bill had been taken in committee for the first time on the 26th March, when it was slightly amended; and then deferred from time to time until the 13th June, when Mr. Paget moved that the age at which boys should be admitted to employment in mines should be fixed at thirteen instead of twelve years, the former being the limit already adopted by the Factories' Act. This was strongly opposed by Mr. Liddell, who, in common with others, desired to leave out the education clauses altogether. The argument he used was, that owing to this clause a great many children would be discharged from the mines, who would find employment

in other ways, and thus in time reduce the number of colliers. It was also urged that it was unfair to introduce a system of compulsory education for any particular trade. Mr. Adderly looked upon this argument as favouring legislation in the direction of education, and suggested the postponement of the clause, with the hope of seeing the principle introduced in a general form in a separate Bill. The discussion which ensued was based more on the principle of compulsory education than on the special clause of the Bill before committee. The clause was, however, eventually retained by a majority of 107 in a committee of 249. It was then proposed to leave out the educational part of the clause, and simply restrict the age to twelve years, a proposition supported by Mr. H. A. Bruce (Lord Aberdare), who did not consider that children in mines "required the special protection of the Legislature," or that their occupation underground was of an oppressive or unhealthy character. All attempts to disturb the proposed education clauses were futile, and they were accepted in committee by large majorities. Thus one great principle of the Bill was accepted—namely, that the uncontrolled employment of boys should be prevented, and that not before the age of ten, and then under certain restrictions, they ought to be permitted to work underground.

These clauses were, however, again attacked, and other amendments proposed for the purpose of rendering them inoperative. It was contended by some members that it was unfair to deprive children, ten years of age, of the means of earning a livelihood simply because they could not read or write; and by others, that the restriction would have the effect of preventing

many from commencing the career of underground labour. The committee, however, supported the Government, and the boys' clauses were passed. The clause placing the iron-stone mines under inspection was next the subject of opposition. The clause included "mines of iron-ore and iron-stone," and Mr. Bruce argued that, as there were no special dangers connected with iron-stone mining, he considered that they ought to come within the Act only when "associated with coal and worked in connection therewith." It was, however, pointed out that in South Wales, where much iron-stone was raised, the accidents were more numerous than the average. A move was next made by Mr. A. S. Ayrton for the appointment of sub-inspectors—one of the privileges desiderated by the working men; but the amendment was not pressed, and the committee passed on to the consideration of the general rules. The first rule, relating to ventilation as it originally stood in the Bill, was as follows:—"An adequate amount of *artificial* ventilation shall be constantly produced in all coal mines, collieries, and iron mines, to dilute and render harmless noxious gases, to such an extent that the working places, and all *accessible places* of the pits, levels, and workings of every such colliery and mine shall, under ordinary circumstances, be in a fit state for working therein." The words *artificial* and *all accessible places* had been expunged on the first reading in committee, and at the suggestion of Mr. Ayrton they were again reintroduced. The same members proposed an additional rule, providing for refuge stalls in the tramways and inclines underground; and a most important new clause, providing for the proper weigh-

ing of the coals wrought—a concession strongly desired by the colliers. On this subject Mr. Cayley, who had been chairman of one of the select committees on colliery matters, remarked that: “In the committees which had sat upon the subject, no point was more insisted upon than the necessity of having weighing machines as between the workmen and the employers.” The amendment was not discussed at that sitting, but subsequently the proposed clause was accepted. The proposal to require notice of non-fatal accidents to the inspectors was negatived, and the option of proceeding in case of any breach of regulation by the workmen, under the Act George IV. chap. 34, was rescinded, and a proviso introduced at the end of the penal clauses excluding mine owners, or their near relations, from acting in the capacity of Justices of the Peace in cases under the Act. A clause was added, at the suggestion of Mr. Ayrton, prohibiting the payment of wages in premises contiguous to public-houses. The Act was made perpetual, and read a third time on the 9th July, 1860.

The progress of the Bill through the House of Commons had been watched with great interest, even anxiety, both by the owners and the men. Every clause, as it was considered in the House, was discussed by the associations representing the proprietary interest and the miners’ delegates, established in London to watch the progress of the Bill. The amendments had been accepted by both parties as a compromise, and the Bill was considered fairly acceptable to both parties. No alterations of any importance were expected to be made in the House of Lords; so much so, that the men’s delegates returned to their districts. However, at the second reading in

the Upper House, symptoms of renewed opposition became apparent when Lord Ravensworth gave notice of his intention to propose some amendments in committee. Accordingly, when the Bill came to be considered in committee on the 23rd July, 1860, Lord Ravensworth proposed and carried an amendment to the education clause. By this alteration it was made optional for a boy either to obtain a certificate of being able to write and read, or to attend school for twenty hours during each lunar month subsequent to his employment, so that boys under twelve years who were able to read and write would be able to obtain employment without the necessity of continuing to attend school up to that age. He also reintroduced the amendment regarding ironstone mines, restricting inspection to those "worked in connection with coal or with any disused or exhausted coal mine;" and restricted the effect of the ventilation rule by eliminating the words "where possible all other accessible places." The rule providing for the weighing of coal was expunged; but at the third reading, owing to the clamour of the delegates, a separate clause to the same effect was added at the end of the Bill. Thus mutilated, the Bill was recommitted to the House of Commons; not, however, without an effort made at the third reading, by Lord Kinnaird, to remodel it on the original basis, by proposing a series of amendments, which were, however, negatived. The unexpected result of the Lords' consideration of the measure quite startled its adherents, and more especially the workmen's delegates, who had been led to suppose that no change beyond verbal alterations would be made by the

Upper House. It was now hoped that in the House of Commons the unpopular amendments of the Lords' might be rejected, or at any rate modified. The measure came under the consideration of the House on the 23rd August, when Mr. Ayrton opposed the amended education clauses, and proposed that boys under twelve years of age should attend school three hours a day for two days in each week. Mr. Clive, in supporting this amendment, remarked that "the House of Commons had carefully considered the clauses of the Bill for sixteen hours, and the whole of their work was undone by the House of Lords in sixteen minutes." Sir George Lewis also regretted the alterations made, and promised, on the part of the Government, that "the subject would receive the consideration of the Government during the recess." No other amendment was pressed, and thus the measure received the Royal sanction on the 28th August, 1860.

The Act, though falling short of the expectations of the workmen, was accepted as an instalment of future legislation. Hitherto, the legislative enactments relating to mining had been of an experimental kind, and the last two Acts had been passed for the limited period of five years; but the result of mining inspection had been sufficiently satisfactory to decide Parliament on legislating in a permanent form, and the Act of 1860 was made perpetual. The measure had received great care and consideration from Government, who had the experience of past legislation, the mass of information collected by Royal commissions, and the assistance of inspectors at their command to guide them in framing a comprehensive

and useful measure. The Act, though imperfect, enforced some regulations essential to the better management of collieries, and more clearly defined the respective duties of masters and men. It promised to be attended with good results both as regards a diminution of accidents and a removal of usages which had led to misunderstanding between the employers and the employed. The subject of accidents caused constant anxiety, and it was absolutely needful for the pacification of the men to make some provision for their prevention, if possible. Not a year passed without the occurrence of some disastrous accident; and during the year which had witnessed the passing of the Act two very serious explosions were recorded. The first of these took place at Burradon Colliery, in the north of England, on the 2nd March, causing the deaths of seventy-six persons. The investigation into the cause of this calamity—which, indeed, assumed rather an acrimonious tone—revealed imperfections in the management which had not been suspected in a colliery of such magnitude in the north of England. The other great explosion took place at the Risca Colliery, in Monmouth, on the 1st December, entailing the loss of 142 lives. These were, however, by no means the only explosions which occurred during 1860. The year had been remarkable for the number of such catastrophes; the deaths recorded amounting to 363, as compared with 95 in the previous year, out of a total of 1109. The inspectors, in their reports, endeavored to give some explanation as to the causes of these numerous fatalities. Mr. Brough, the inspector for the Western district, attributed the explosions to unusual meteorological

conditions. No doubt the changes in the weight of the atmosphere have a considerable effect on the gas contained in the goaves or pent up in the coal. When the barometer is low, more danger is to be apprehended, from the exudation of gas, than when, under greater atmospheric pressure, the barometer stands high. But other things were in action to cause so many accidents. In speaking of the Risca explosion, which could not be attributed to insufficient ventilation or sudden irruptions of gas, he remarks that the great error committed at that colliery was the "postponement to an indefinite period of a new shaft to the deep, and the endeavour to obtain a certain maximum quantity of coal without the aid of such essential grand new winning. The attempt to perform too much with restricted means is almost invariably attended with unsuccessful results." Again, Mr. Dunn, in speaking of the Burradon Colliery, which he had visited in 1858 at the instance of the workmen, said, "that at that time the colliery was in a fair and satisfactory state," but that in 1860, "while the managers of Burradon Colliery had been pressing for large quantities of coals from a limited area of mine, and extending the workings greatly to the rise, they had in many material points entirely changed the state of the colliery." Referring to the same subject, Mr. Higson, the inspector for the Cheshire district, in his report for the year 1860, after alluding to the great number of accidents, observes: "That the district under consideration is fast becoming one of great importance; the vast, and almost unlimited demand for coal throughout this part of the country, which would seem to a stranger to exceed belief, has brought forth

a corresponding supply, so that within a short, but active period, the production has been largely augmented." After describing the rapid extension and deepening of the collieries, Mr. Higson continued as follows: "It may, therefore, be readily seen that in this state of transition and extension, not the work-
persons only, but managers also, were frequently taken by surprise, thereby rendering their duties, which are at all times difficult and responsible, under such circumstances considerably more arduous to perform; and it is not assuming too much when I say that while this continues, accidents, both numerous and serious, may be expected." Mr. Hedley, the inspector for the Midland district, also attributed the increase of accidents to the increase in production of coal. The cause of the abnormal increase of accidents was perhaps rightly attributed, at least, in part, to the great pressure put on the staff of the collieries by the demand for coal. The precautions needful for safety may at such a time be neglected when the attention of all concerned is directed towards the effort of increasing the out-put. Still, this explanation is barely sufficient to account for the numerous fatalities which occurred at that time. Ere the year closed an accident, almost unique in its kind, occurred at the Hetton Colliery, where an explosion of gas took place in the flues of a boiler underground. The gas had been allowed to accumulate during two-and-a-half hours, and was in sufficient quantity to cause a very serious explosion, by which twenty-two men lost their lives. Only one other instance of such an accident appears to be on record, and that occurred at the Felling Colliery in 1847. The rapid succession of startling and fatal accidents at

collieries during the year drew special attention to the subject, and in consequence a number of suggestions and proposals were put forward by philanthropic, scientific, and practical men, with a view to reducing the loss of life caused by such catastrophes.

Some proposed collecting the gas in chambers underground, like gasometers, and leading it thence to the surface in tubes; others suggested sending fresh air down into the mines in pipes, which were to branch off into all the ramifications of the underground workings. Many schemes for increasing the ventilation were proposed, and some new safety lamps invented. But all these proposals were more or less impossible to carry out in practice, and the experience of the past pointed to careful and intelligent management as the best security against accidents. To secure this, it was evident that a better class of managers and overmen would be required. This led to the suggestion that candidates for employment as colliery viewers ought to undergo an examination before a competent tribunal, and obtain certificates of competency, somewhat similar to those granted to the merchant navy. Although this idea was so strongly advocated in 1861, it was not until the year 1873 that it was carried out in practice. While these numerous and varied suggestions were being made for improved and safer mining, some of the journals of the day filled their columns with clamorous denunciations of colliery owners, who were blamed for all the calamities which occurred at collieries, and accused of heartless neglect of the lives of the men employed underground.

These general statements were, however, as un-

deserved as they were offensive. The great majority of the colliery proprietors had accepted the Act of Parliament, with its regulations for the safety of the men, with a good grace, and were ready to observe its provisions. The inspectors, it is true, found some trouble in framing new codes of special rules for the different districts, and in their report for the year 1861 they allude to the difficulties they had to contend against. In Mr. Dickinson's district, the Local Association of Lancashire and Cheshire had drawn up a code which did not meet with the approbation of the inspector, and much discussion ensued, causing considerable delay; so much so, that, as Mr. Dickinson said in his report: "Before all was done, and the rules established generally throughout the district, most of the year had slipped away." In Mr. Higson's district, arbitration had to be resorted to in order to frame the new set of special rules. A very lengthy conference ensued, during which some hot discussions took place between the inspector and the colliery owners. The arguments, however, resulted in the adoption of a set of rules fairly acceptable to both parties; and the matter once settled, the coal owners presented a gold snuff-box to the inspector as a mark of their appreciation of his zealous exertions. The alterations or additions to the special rules in other districts were adopted without so much discussion. The other clauses of the Act did not cause so much trouble, and the difficulties of carrying them out prognosticated by the opponents of the measure were not realised. The education clauses did not stop the collieries, and the general rules had a beneficial effect. The greatest difficulty experienced by the colliery owners was to

secure managers competent to carry out the provisions of the Act. In many districts this want was greatly felt, and in many cases incompetent managers were employed owing to the difficulty of finding better men. As a matter of fact, many collieries, even large works, were entrusted to ignorant managers. Mr. Brough, in his report on the South-Western district for 1861, made the following pertinent remarks on the subject:—"Some recent inquests have demonstrated in a lamentable manner that which I have long been well aware of, namely, the deplorable amount of ignorance too often found in those who are actually entrusted with the practical management underground, many of whom, indeed, do not know a letter of the alphabet." This account of the prevailing ignorance among persons entrusted with the weighty responsibility of the lives of the men underground, and the security of colliery property, was by no means confined to the Bristol district. In South Wales, for instance, at an inquest held on the bodies of thirteen men killed by an explosion in March, 1861, at the Blaengwar Colliery, the overman in his evidence stated: "I am the overman at Blaengwar Colliery. I have been so for seven or eight years. I cannot read, write, or speak English." This is but one out of many instances of the ignorance prevailing among overmen of collieries which have been brought to notice at enquiries held into the causes of colliery accidents.

At the commencement of the year 1862 the whole country was startled by an accident unprecedented in the annals of colliery catastrophes, and memorable through the great loss of life which it caused. The beam of the pumping engine at the Hartley Colliery

suddenly broke on the 16th of January, and falling down the shaft practically closed the pit on 204 men, who were suffocated underground. This extensive colliery had only one shaft, which was divided by a wooden partition, or brattice. One division of the shaft was used for pumping, and formed the upcast for the ventilating current; the other division was used for drawing up coals, and as the downcast for air. The working contained much water, and the pumping engine was a very powerful one. The weight of the water raised at each stroke of the pumping engine amounted to fifty-five tons, which had to be borne by the engine beam, constructed of cast iron, and placed directly over the shaft, and connected with the pump rods. On the day of the accident one set of pump rods broke, and the engine suddenly lost its load, whereby the beam came down with great velocity on the catch-pin and broke. The part over the pumps, weighing about twenty tons, fell down the shaft, tearing with it all the fittings, shattering the brattice, and loosening the walling, besides disturbing some of the strata. The shaft was thus suddenly choked with debris, and no exit remained for the unhappy men, who were thus buried alive in the underground workings. On this occasion, valiant—nay, heroic—efforts were made by colliers and shaft sinkers to rescue their entombed brethren. The sinkers prosecuted their work unremittingly in the face of the greatest dangers, and under the most trying circumstances. Water poured down upon them in torrents; stythe, or choke damp, rose up in volumes through the debris, affecting them almost to suffocation; and the walling of the shaft was constantly falling from the

sides during the work. These efforts were all, however, in vain. When, at last, a communication was effected, it was too late to recover the 204 men, who were all dead. The extraordinary circumstances of the accident, and the number of lives lost by it, created intense excitement among all classes, and in all parts of the country. Her Majesty telegraphed to the colliery while the work of clearing the shaft was proceeding, to enquire as to the fate of the men underground, and when the dismal fact of their death was ascertained she headed the subscription made in aid of their sorrowing relatives. At a meeting held at Newcastle for the purpose of organising a fund for the benefit of the widows and orphans of the dead colliers, the Bishop of Durham paid a well-deserved tribute to the courage and devotion of the sinkers and others, who, at the peril of their lives, volunteered to work for the rescue of their buried comrades.

The Bishop, in addressing the meeting, said: "I call these men the real heroes of the people, and I feel Northumberland may well be proud of possessing them. I feel the whole country must be proud of them." Shortly after the accident the Home Secretary issued a circular to the colliery inspectors, requesting a return of the number of collieries working in each district, with only one shaft, specifying the plan, depth; and fittings of such shaft. The inspectors, in their replies, were unanimous in recommending the Government to enforce two means of exit at every colliery, for the safety of the men underground. This view was also supported by a numerous signed petition to the House of Commons from the county of

Durham, expressing the feeling of the majority of the colliery owners and viewers. In consequence, Sir George Grey brought in a short Bill on the 16th June, 1862, with the object of prohibiting collieries being worked without at least two means of exit for the men, but giving existing collieries ample time to comply with this regulation, either by sinking new shafts or effecting a communication with others existing in the vicinity.

The advocates of mechanical ventilation took the opportunity of pointing out that had that system been in use at the Hartley Colliery the men would not have been suffocated; and by some, it was argued, on the strength of past statistics, that there was no necessity for an Act of Parliament to meet the danger of an accident not likely to occur again. No opposition, however, was offered to the Bill during its passage through Parliament, and the colliery proprietors admitting the justice of the regulation, submitted without much cavil to the expenses thus entailed on them.

CHAPTER VII.

AGITATION AMONG COLLIERIES FOR MORE LEGISLATION—COMMITTEE OF HOUSE OF COMMONS APPOINTED, 1864—TERRIBLE EXPLOSION AT THE OAKS COLLIERY—REPORT OF COMMITTEE AND DISCUSSIONS IN THE HOUSE OF COMMONS.

THE Act of 1860 was the result of a compromise between the masters, the workmen, and the mine inspectors. The clauses objectionable to the owners had been worded so as to cause them as little inconvenience as possible. The men had been met in many ways, but more specially by the introduction of the weighing clause; and the inspectors had carried their points as to securing the direct notice of accidents, and extending the Act to some mines of iron-stone. The men had been clamorous for the appointment of sub-inspectors, but the dread of introducing anything like Government management had prevented the adoption of such an extension of the principle of inspection. The number of the inspectors had, however, been doubled, and their powers greatly increased. In fact, since the passing of the first Mines Inspection Act, in 1842, commonly known as Lord Ashley's Act, the system of inspection had been gradually developing. ✓

At that time a system of underground inspection was considered an impossibility. But the continued succession of grave accidents led to the Parliamentary enquiry in 1849, out of which followed the Act of 1850, instituting underground inspection. This Act,

however, did little more than provide for the appointment of the inspectors, who were few in number, and not invested with much authority. They could do little more than record the number of accidents, and act as assessors to the coroners holding inquests on the victims of the accidents. Colliery accidents did not diminish, and further Parliamentary enquiries into their causes, and the means of preventing them, resulted in the passing of the Act of 1855. The opposition of the colliery owners to inspection, which had always been very decided, now became more organised.

Objections were raised to the supervision to be exercised by the inspectors and the possibility of "prying and meddling" in private business. The viewers of high standing gave the system of inspection but faint support, and did not anticipate any beneficial results from it. They could obtain little assistance or information from inspectors, who, in all probability, would be inferior to them in experience and knowledge. But, on the other hand, in many coal districts there were numbers of small collieries which were badly managed by men who had been pitchforked, as it were, into such situations, without the needful experience or information. Some collieries, indeed, were left in the charge of ignorant overmen, who were unable to judge of the extent of danger, or to avoid it if they could.

The owners of such ill-managed collieries dreaded inspection, perhaps more on account of the expense they might be put to by the improvements or alterations they would be forced to adopt, than on any other grounds. The proprietors, however, felt that if the

principle of inspection had to be accepted by them it ought to be so curtailed in power as not to affect their material interests. On this account the masters, or their representatives, hurried up to London in 1854, and sat in conclave in order to influence the framing of the new Act so as to suit their views. Their influence prevailed, and the measure exercised but a small influence on colliery management. The great loss of life through explosions and other accidents, which was recorded during four years following the passing of the Act of 1855, roused the men to action, and caused them to combine and commence an organised agitation with a view to procuring such alterations in the Act of Parliament as would, in their opinion, tend to greater safety in the working of coal. They were at the time assisted by the high rate of wages, which enabled them to organise and support local associations, and to send up delegates to London to submit their views to the attention of the House of Commons during the discussion on the Bill of 1860. In consequence of their persistence they gained some of the points they contended for. Thus, if the Act of 1855 may be denominated a master's measure, that of 1860 was a compromise between masters and men. As such it failed to give general satisfaction, although it contained several new clauses relating to the safety of the men underground.

Distinct rules were laid down for the guidance of managers, the powers of the inspectors amplified and extended to iron mines worked in connection with coal, and the responsibility of owners was more clearly defined. Accidents, however, continued to occur; and these were, rightly or wrongly, attributed by the men,

or rather by their leaders, to the inefficiency of the Act of Parliament.

Agitation was noticeable in the various colliery districts among the men shortly after the passing of the Act, and expressions of dissatisfaction found vent at public meetings and holiday gatherings. Certain grievances were put forth, such as long pays; the evasion of the Truck Act by many owners; the number of working hours underground; and, above all, the system adopted for gauging the coal wrought. The men complained, generally, of the overweight they were obliged to make, and the large percentage of deductions to which they had to submit.

To provide against any unfairness in the measuring of the coal, a clause had been inserted in the Act enabling men to appoint a check-weigher at their own expense. But the clause had not effected the result intended. The almost universal dissatisfaction eventually led to a determination to hold a great representative meeting in the autumn of 1863, to which every district should send a certain number of delegates. The mining districts were suddenly flooded with circulars explaining the object of the proposed meeting, and urging on the colliers to hold district meetings to discuss their grievances, and to suggest such remedies as they considered sufficient. The subject of accidents was prominently treated in this document; and one object of the great meeting, as described in the circulars, was to "endeavour to prevent those fearful atrocities that decimate their ranks as pitmen, and startle momentarily the public mind, and then pass away like the shadow of a cloud over a field in summer; the only effects of which are

hid from the public eye in the agonised bosom of the relict of the slaughtered, or buried beneath the cold shelter of the workhouse."

Language such as this, frequently repeated and sedulously distributed among the colliers, did not fail to produce its effect. They were roused by the recital of their wrongs, and followed the voices of their teachers and leaders. General open-air meetings and private conferences of delegates followed in rapid succession in different parts of the country. Regularly organised associations were formed, comprising presidents, secretaries, and treasurers, and these issued manifestoes, lists of grievances, and inflammatory circulars. At some of these meetings the question of wages was discussed, but as a matter of secondary importance, as they were high at the time. The absorbing questions of the day were those relating to improved education for boys; restriction of age for their employment to twelve years; reduction of working hours for youths up to fourteen years of age; more stringent general rules to ensure greater safety; payment of coal by weight only; complete abolition of the truck system; and, lastly, increased and improved inspection.

As might be surmised, there was a large amount of speaking, and a great deal of irrelevant matter introduced in the speeches delivered at the workmen's meetings. But although they exaggerated the grounds of their dissatisfaction, there were grievances of which the colliers had a reasonable right to complain. It was true, that in too many cases the lives of the colliers were left at the mercy of ignorant or incompetent managers, little above the social grade of those work-

ing under them. It was also true that the Truck Act was frequently evaded; and that the weighing or measuring of coal sent up from the mine was in many cases performed in an arbitrary and unsatisfactory manner. It might also be said that the inspection of the collieries was insufficient, if not unsatisfactory.

The object of inspection, from the commencement, had been to act as a check on careless or reckless working, but not to interfere with the management, or relieve those interested with its responsibilities. At some of the meetings great stress was laid on the allegation that the inspectors were appointed by the owners, or at least through their influence, and therefore, it was argued, such inspectors ought to be selected from the class of overmen, in order to protect the men. The colliers, in general, were alive to the importance of education for those entrusted with the management of collieries; and they frequently, at their meetings, alluded to the desirability of compelling all colliery officials to pass some examination of proficiency in their profession before being entrusted with any responsible post at a colliery.

All these points were fully discussed at the great conference of miners' delegates, held at Leeds, in November, 1863, which concluded by the organisation of "The Miners' National Association," having for its object the consideration of "the interests of operative miners, as regards legislation, the inspection of mines, and compensation for accidents."

This association formed a powerful combination, and was mainly instrumental in preserving that unity among the men which proved so strong and

enabled them to obtain so many concessions in the sequence.

At the instigation of this association a petition was sent up to Parliament, in the spring of 1864, which undoubtedly had weight in stimulating and directing legislative enquiry.

Meantime, the year 1863 had passed without the occurrence of any great colliery accident. The number of deaths recorded was less by 226 than during the previous year, and the inspectors, in their reports, gave a favourable account of the working of the Acts. Arrangements were being made for providing each colliery with two exits, in compliance with the Act of 1862; and the relations between the colliery proprietors and the inspectors were in general amicable, although in the north a decided case of animosity between the owners and the inspector is recorded. This arose out of a complaint made by the workmen of the Cleator Moor Colliery to Mr. Dunn—a practice which about this time began to prevail owing to the opinion then held by the men that better management could only be secured through the intervention of the inspector.

They persistently held to this view, and pressed it over and over again at their numerous meetings during the year 1864. The agitation among them for more legislation was considerable and unremitting, owing in a great measure to the indefatigable energy of their leaders. Delegates were even sent up to London, during the session, to confer with members of Parliament as to the best steps to be taken to secure some further legislation during the next session. The year passed over without the occurrence of any serious accident, and the reports of the inspectors showed a

diminution of forty deaths as compared with the previous year. A steady improvement in the management of collieries was taking place, and a much more extensive application of improved machinery. The year 1865 opened ominously for the colliers. The coal trade was not prosperous, and notices of reduction of wages had been issued by the masters in various districts; while the workmen held meetings to discuss the vital question of wages more than the necessity of further legislation. This subject was not, however, entirely neglected, and petitions continued to be sent up to Parliament. When Mr. Ayrton, on the 9th May, moved in the House of Commons for "A select committee to enquire into the operation of the Act for the regulation and inspection of mines, and the allegations of the petitions presented to the House upon the subject from the miners of Great Britain," he was able to illustrate his arguments by presenting petitions from 10,000 miners. The motion was agreed to, and a select committee duly appointed "To enquire into the operation of the Acts for the regulation and inspection of mines, and into the complaints contained in petitions from miners of Great Britain with reference thereto, which were presented to the House during the session 1865." The committee extended their enquiry over three sessions, and their report was not published till 1867. It had been quite understood that the labours of this committee would lead to some alteration of the law, and that the recommendations made by them would in all probability be used as the basis of any new measure. Both employers and employed made every exertion to influence the decision of the committee by their evidence. In

addition, meetings of colliery owners and men's delegates were frequently held, as well as conferences between masters' associations and deputations from the men. The coal trade seemed divided into two opposing armies, each preparing for the coming struggle. The colliers, on this occasion, had acquired considerable accession of power by enlisting the co-operation and assistance of men of high standing and influence. While, by means of the miners' associations, which flourished in every colliery district, and which were alluded to by the inspectors in their reports for the year, the men preserved unity in their action, and collected the necessary funds.

The year passed over without any accident of magnitude, although the deaths exceeded those of the previous year by 117. The following year, however, namely, 1866, was the most disastrous hitherto recorded in the annals of colliery accidents. In this year the catastrophes were not limited to any one district, but nearly all the colliery centres contributed their ghastly quota to make up the unprecedented total of 1484 lives lost.

The Yorkshire district witnessed the terrible explosion at the Oaks Colliery, the most terrific which had ever been recorded in this or any other county. In Staffordshire an explosion occurred at Talk-o'-th'-Hill, resulting in ninety-one deaths. The inspector for South Durham, in his report, states that "the number of deaths is unusually large;" and the inspector for West Lancashire reports that in his district "a greater number of lives were lost in and about the mines in the year than in any previous one since I entered upon my duties as inspector;" and in South Stafford-

shire an increase of eighteen deaths is recorded. The dreadful accident at the Oaks Colliery, by which 334 colliers working in the pit lost their lives, and twenty-seven volunteers, who descended the pit immediately after the occurrence, were killed by successive explosions which took place on the day following the first catastrophe, created an unusually painful sensation throughout the country generally, and among the mining world more particularly. It seemed as if all the efforts which had hitherto been made to prevent, or at least reduce, the fatality of colliery accidents, had been completely abortive; and people reflected with almost despairing sadness on this calamity, which had occurred in a reputedly well-ventilated pit, under the management of one of the first mining engineers of the day, and worked under approved rules of organisation and discipline.

A searching enquiry took place at the inquest, which lasted thirteen days, and detailed reports were made on the explosion by Mr. S. K. Blackwell and Mr. Dickinson, inspector of mines, specially instructed by the Government. At the termination of the enquiry, the jury, in their verdict, found that the deaths had been caused by an explosion of fire damp, but that there was "no evidence to prove when or how ignited." From the evidence, and the opinions recorded in the two reports on the occurrence, the cause of the explosion may be attributed to the working of the seam of coal towards the rise, thus leaving goaves at a lower level than the working face, which became reservoirs of carburetted hydrogen. Any abnormal occurrence, such as a diminution of atmospheric pressure, or falls of rock, caused by dislocations of the superincumbent

strata over the goaves, would then force the gas upwards on to the working face; and, if the quantity were sufficient to vitiate the ventilating current up to the explosive point, the danger of a catastrophe such as occurred would become imminent. This terrible explosion produced a deep impression, as might readily be supposed, on the working colliers. They at once organised a deputation to wait on the Home Secretary, and urge the necessity of appointing a commission to enquire into the causes of the recent accidents at the Oaks and Talk-o'-the-Hill Collieries. The deputation was introduced by Lord Elcho, and accompanied by several Members of Parliament. But beyond a general promise that the interests of miners would be attended to by the Government, the Home Secretary made no statement. On the day of the opening of Parliament, however, the Under-Secretary of State (Lord Belmore) moved for copies of the official reports on the recent accidents, as it was the intention of the Home Secretary to refer them to the committee of the House of Commons which sat during the previous session, and which it was intended to re-appoint. On this occasion, Lord Wharnccliffe made some observations on the subject, giving it, as his opinion, that the inspectors of mines ought to have additional powers, and their number be increased. The subject was referred to on several occasions during the session.

Thus, on the 22nd March, a discussion on mines took place in the House of Commons, on the occasion of Mr. Clive drawing attention to the metalliferous mines, in the course of which Mr. Kinnaird made some observations on the defective ventilation of coal mines, and, among other things, suggested that the

presence of five per cent. of gas in a coal mine should be considered an offence against the Colliery Inspection Act. It is needless to add that this suggestion was never seriously entertained by any one. Lord Elcho also drew attention to the unsatisfactory state of inspection; but the Home Secretary, in reply, merely assured the House that the subject was not lost sight of by the Government. In fact, all steps towards amending the existing laws of inspection were postponed until the committee had completed its enquiry. The agitation for further legislation out of doors continued with unabated energy, and no opportunities were lost by the leaders of the various miners' associations to expose any shortcomings in the working of the Act. That a very complete organisation existed among the men became apparent from the evidence they gave before the select committee. On the subject of their grievances as set forth in the petitions, the evidence given by the delegates from every district was singularly uniform, and, in many cases, very clear and comprehensive. One witness, in referring to the desirability of paying the men on the weight of coal wrought instead of the number of tubs filled, explained that the latter gradually *grew* in size, and that though holding only five hundredweight when new, they contained six and seven hundredweight after having been repaired. The evidence on the subject of weighing was very consistent. So was that on the non-employment of boys underground under the age of twelve years, and the advisability of limiting their hours of work to eight per day. It was elicited, however, that the men themselves were in general to be blamed for any breach of the education clauses, and that most of

them considered the almost prohibitory restriction on the labour of boys as a great hardship. The move to reduce their hours of work was intended as the commencement of a general eight hours' system for all employed underground. It was well known that when the boys left the pit the whole work had to stop, as their duties, such as keeping the ventilating doors, driving the ponies, or hauling the tubs, were absolutely necessary to enable the colliers to proceed with the more important branch of hewing the coal and sending it away from the face.

In the evidence the men gave regarding inspection they strongly urged the appointment of sub-inspectors, who would examine the mines frequently and thoroughly. The colliery proprietors, mining engineers, and inspectors, considered the existing inspection quite sufficient. Mr. Woodhouse, certainly, in the weighty evidence he gave, recommended the appointment of assistant-inspectors, to act under the inspectors, but more in the way of articulated pupils than as inferior officers, enabling them thus to gain the experience necessary to qualify in time for the post of inspector. He hoped, by this method, to do away with what he called "the patronage system of appointing inspectors." He referred here, most probably, to appointments which had been made through the recommendation of influential colliery proprietors, who supported the claims of candidates known to them in their districts. The views entertained by the different witnesses, as to the duties of the inspectors, were so varied, that the committee, before closing the inquiry, examined Sir George Grey on the subject. He had been in office during the passing of the Act

in 1850, under which the inspectors were first appointed. Sir George Grey very clearly stated that the Government never had intended to saddle the inspectors with any share in the responsibility of management, which was to rest entirely with the owners. This limit of the duties of the inspectors had been thoroughly approved by the owners of collieries. Sir George Grey was the last witness examined by the committee, who presented their report in July, 1867. In the report the committee commenced by referring to and quoting the miners' petition which had been referred to them, and which contained a recital of their grievances; then, after dealing *seriatim* with the different subjects, namely, the employment of boys, improved ventilation, increased inspection, careful weighing, the Truck system, and coroners' juries, they submitted at the end of the report a series of resolutions and recommendations. In these they suggested some alterations in the existing law. They fixed the limit of age for boys to be employed underground at twelve instead of ten years; recommended that the weights and measures should be tested by the inspector of weights from time to time, and that the law regarding Truck should be modified in order to be more effectual. With regard to safety, they proposed a new rule, prohibiting the use of gunpowder in mines where safety lamps were enforced by the special rules, unless authorised to be used by the special rules, and some less important alterations in some of the general rules. They then made a bold suggestion with reference to underground workings, namely: "That it is expedient to provide that it shall not be lawful

to employ more than 100 persons in any mine, unless such mine be divided into separate districts or panels, in such manner as that each such separate district or panel shall have one or more independent intake and return air-way from the main air-way to the main return or upcast. That in mines so divided not more than 100 persons shall be employed in any separate district or panel; but that power to dispense with the strict and immediate application of this recommendation should be vested in the Secretary of State." After this sweeping recommendation, they found it "expedient to prohibit, in all cases, the deduction of the price of timber used in propping" from the wages of the men, and recommended that a barometer and thermometer be placed in a "conspicuous position in each colliery." With reference to inspection, one of the principal subjects of their enquiry, they stated, "That the present staff of inspectors should be increased, with a view to more frequent inspection; but it is not desirable that men of a lower standard than those at present selected should be employed in the discharge of this important duty."

Thus the evidence of the delegates in favour of sub-inspectors had not carried conviction to the minds of the select committee. They concluded their resolutions by recommending an alteration in the Act with regard to the manner of selecting arbitrators, and that if "the Acts relating to mines and collieries, be amended, they should at the same time be consolidated." The report was presented too late in the session to attract any Parliamentary attention; the more so, perhaps, as the year 1867 had not been noteworthy for startling accidents, and the death-rate,

according to the returns of the inspectors, had receded from the abnormal figure of 1484 in 1866 to 1190, showing, therefore, a diminution of 294 deaths during the year.

In February, 1868, Mr. Neate took an opportunity of asking the Secretary of State, "Whether it was his intention to bring in a Bill for the regulation of coal mines, founded on the report of the committee on that subject, which was presented last session, and further, whether any additional inspectors had been or were to be appointed." Mr. Hardy, the Secretary of State, in reply, stated that he was in communication with several persons on the subject, and the appointment of additional inspectors was still a matter for consideration. He was only disposed to appoint a sufficient number of inspectors to see that proprietors managed their mines with care.

During the session the subject was on several occasions alluded to in the House of Commons. On the 28th April, Mr. Greene made some observations on colliery accidents; and again on the 26th May, when he moved for a Royal Commission to enquire into the cause of such disasters. In doing so, he dwelt principally upon the inadequacy of the system of inspection, and advocated the appointment of sub-inspectors, as prayed for, in the miners' petition. A short discussion ensued, which was closed by a count-out. Later on in the session, Mr. H. A. Bruce called attention to the report of the select committee, and expressed a hope that the matter would be considered by Government during the recess. The Home Secretary, in reply, while agreeing that the subject was one deserving attention, simply pointed to the impos-

sibility of introducing a measure during that session. In fact, the Government of that day were so fully occupied with other measures of great importance, and the House so engrossed by stirring political events, that measures relating to home legislation, however important, were for a time passed over.

The subject of legislature for mines was thus shelved for that session, to be taken up again in the next year by a new House of Commons, and another Government. The agitation of colliers during the year had been considerably less than previously, but still the subject was kept up by the leaders of the movement. Indeed, the new House was appealed to before it came into existence by speakers at a meeting held at Mr. S. Plimsoll's house, near Sheffield, on the 5th September, 1868. In addition to the usual delegates, this meeting was attended and addressed by Mr. C. Neate, M.P., Mr. Mundella and others, and the following resolution put and carried: "That this meeting having learnt from practical experience, which is verified by Government returns, that no less than 1000 persons are killed every year in the various mines of the United Kingdom, and believing that sufficient experience has been gained to show the absolute necessity of a more extended and rigorous inspection of mines, and a greater number of inspectors, would urge upon the new Parliament to take up the question as one of the most pressing and important that can possibly occupy its attention." The mining population was, at the time, so excited with reference to the expected legislation on mines inspection, that they took a much greater interest in the elections than usual. The excitement was so great that Mr.

Higson, inspector for the Lancashire district, in his report for the year attributed the increase in the number of deaths in part to the agitation caused by the elections, in consequence of which "the workings were in some measure neglected, and the work-people became idle, careless, and, in fact, demoralised." This, however, was the only district where an increase of accidents had taken place, as the returns for the whole country shewed a decrease of 179 deaths as compared with the previous year.

While thus an agitation was kept up in all the mining districts of the country for more legislation, the development of the coal fields proceeded with steady yet rapid strides. During recent years great improvements had been introduced in the working of collieries. The extension of the coal trade had been so great as to necessitate the opening out, and it might almost be said the discovery, of new fields, while the known seams were being worked at depths hitherto unknown, to meet the growing demand. As a matter of necessity new or improved mechanical appliances had to be introduced to overcome the increasing difficulties.

The first patent for coal-cutting machinery dates from 1862, and the invention was tried first at the Ardsley colliery. Many other similar inventions followed, and were tried with more or less success at different collieries. It was at that time confidently expected that these machines would soon come into general use at collieries.

The workmen also at one time shared this opinion, as may be inferred from a resolution passed at a meeting of one of the miners' associations, to the

effect that they were well satisfied to witness the introduction of machinery for cutting coal underground, as it might tend to diminish the loss of life. But these appliances did not fulfil the hopes of their inventors, and to this day an efficient coal-cutting machine remains to be invented. During this period round steel or wire ropes came into general use. Nitroglycerine was invented or rather applied as an explosive, and ventilating fans were largely introduced. Ventilation by mechanical means, though not unknown in England, had been hitherto but rarely practised. About this time a new question began to attract attention, namely, the probable duration of the coal supply. The discussion of this question almost led to some legislation to control the waste of coal both in working and consuming. Public attention was first drawn to the subject by the publication of Mr. Hull's book on the Coal Fields of Great Britain in 1861. At the meeting of the British Association for the Advancement of Science at Newcastle-on-Tyne in 1863, Sir William Armstrong, the president, referred to the subject, and startled not only his audience, but the whole country, by alluding to the possibility of the coal supply being exhausted in a couple of centuries. In 1865 Mr. Jevons, basing his calculation on the data of Mr. Hull, and taking the ratio of increase in production as equal to that of the previous years, predicted the exhaustion of the coal in Great Britain in 110 years. This subject was of such grave importance that it became a topic of discussion in the House of Commons. Mr. John Stuart Mill was the first to allude to it in Parliament. Mr. Gladstone mentioned it in his

budget speech of 1865, and a long debate took place in the House of Commons on the 12th June, 1866, when, at the instance of Mr. Hussy Vivian, a Royal Commission was appointed to investigate the probable quantity of coal existing, to inquire as to the quantity of coal consumed in the various branches of manufacture; whether any waste takes place in the working, and other matters connected with the subject. The commission, appointed June 28th, 1866, reported in July, 1871, having during this time made a most searching and complete investigation of the subject. They estimated the total quantity of coal available at 146,480 millions of tons, representing the consumption for 360 years on the basis of diminishing ratios of population, or a consumption for 276 years at a yearly increase of three millions of tons, or finally, on a duration of 1273 years, supposing the population and consumption of coal to remain constant.

The results thus arrived at served in some degree to allay the fears of a proximate exhaustion of the coal fields, but they also showed clearly that the supply was limited, and warned the nation to husband its resources. No legislative action was recommended by the commission or proposed, although to many persons it seemed judicious to endeavour by Act of Parliament to put some check on the great waste of coal caused by faulty methods of working and extravagant modes of consumption.

Before reverting to the expected legislation on coal mines, it may not be out of place to refer to the action taken in Parliament with regard to mines not coming under the Coal Mines Inspection Acts.

A Royal Commission had been appointed in 1862 to enquire into and report upon the condition of all mines in Great Britain, to which the Act for the regulation and inspection of coal mines did not apply. This commission summed up the results of their most elaborate inquiry in a number of resolutions.

The evidence has clearly shewn that the miner's life was shortened by breathing vitiated air, and the commissioners stated, "That there is a great excess of sickness and mortality amongst metalliferous miners, which is mainly attributable to the imperfect ventilation of the mines."

In metalliferous mines, the workman has generally to undergo considerable physical exertion in climbing up and down ladders if the mine be one of any depth, and is exposed to great changes of temperature in coming to the surface from a narrow ill-ventilated gallery underground.

To remedy the evils resulting from these causes, the commissioners recommended: "That every mine should be provided with proper houses conveniently situated, in which the men can change and dry their clothes; that surface work should, as far as practicable, be carried on under shelter, and that suitable places should be provided in which the woman and children employed at the mines might take their meals; and that, in order to avoid the evil consequent on climbing ladders, mechanical means should be provided to convey the men to and from the surface, when the mines are of great depth."

The resolutions of the commissioners' report dealt with the means of diminishing the numerous accidents underground caused by men falling down ladders, falls

of rock, want of caution in blasting, defective machinery, the bursting of boilers, and sudden irruptions of water. It was suggested that the ladder ways ought to be properly devised; that stringent rules should be laid down with regard to blasting; that the boilers and other machinery should be periodically examined; and that plans of abandoned mines should be deposited at the office of the clerk of the peace for the county, and at the Government Mining Record Office. They recommended that as a rule no boys under fourteen years of age should work underground. They also found that the system of mine clubs was not satisfactory, inasmuch that provision was not made for cases of sickness.

Early in 1865, the commissioners held meetings at the Home Office to discuss the draft of a Bill, but they agreed to defer making any suggestions until the report of the commission should have become more generally known and discussed.

However, Lord Kinnaird, the chairman of the commission, dissenting from this view, introduced a Bill to the House of Lords on March 30th, 1865. This Bill was, however, withdrawn, and the subject deferred until 1869, when Mr. Bruce introduced the "Mines Regulations Act," which applied to mines of every description.

CHAPTER VIII.

GOVERNMENT MEASURE OF 1869—DISCUSSIONS IN PARLIAMENT DURING SESSIONS 1870-1871-1872 — MEETINGS OF MINE OWNERS, MANAGERS, AND MEN IN THE DIFFERENT MINING DISTRICTS TO CONSIDER THE MEASURE—FINAL PASSING OF THE ACT IN 1872.

It was fully anticipated that during the session of 1869 a Bill would be brought forward by the Government, who were in fact almost pledged to do so. The subject had been very fully examined into by the select committee, which had sat for three consecutive sessions, and the opinions held by masters and men were thoroughly known, not only through the evidence given before the committee, but also from the speeches made at the numerous meetings which, during six years, had been held in different parts of the country. In all the discussions which had taken place the education clauses had held a prominent place. Those who desired to make some provision for the education of the mining population, and guard against the evils of juvenile labour, urged that the limit of age for the employment of boys should be fixed at twelve, or even thirteen years. Whereas the coal owners desired to fix an earlier age, more especially for those districts where thin coal seams were worked. The colliers coupled the limit of age for the employment of boys with a limitation of the number of working hours.

The general and special rules had also been the

subjects of much consideration. The coal owners desired to see such general rules adopted as would not interfere with the economical working of collieries. They also sought, in the special rules, to throw the responsibility as much as possible on the working colliers, and hence much wrangling ensued between the proprietors and the Government inspectors with regard to the framing of these rules.

With regard to inspection, the masters opposed anything like interference with the management of their works, and especially objected to sub-inspectors prying into the underground workings. The men, on the other hand, asked for stringent general rules, binding the owners to adopt measures for the safety of their mines, regardless of the cost of carrying them into practice. They also pressed for a more complete and inquisitorial system of inspection, basing their demands on the incompetency of many of the colliery managers. The manner of paying for the coals wrought had long been a cause of disagreement between masters and men. The system of paying by the number of waggons sent out of the mine was objected to by the colliers, on the ground that it was unfair to estimate their labour by a measure, the contents of which was variable at best, and was never accurately ascertained. Moreover, the system was open to abuse on the part of unscrupulous owners or their agents. It was, therefore, urged that the coals ought to be weighed at the pit bank. The masters objected to this, partly on account of the inconvenience and expense caused by the alterations needful at the collieries, and partly as an unreasonable and useless change. They also objected to check-weighers being appointed

by the men, who would be constantly on the pit bank, and thus have opportunities of prying into the management of the collieries and fomenting disputes between masters and men.

These were the most salient points of disagreement between the employers and employed, all of which would have to be considered in framing any new measure relating to mines inspection. The expected measure was brought before the House of Commons, on the 15th April, by Mr. H. A. Bruce, then Home Secretary.

The Bill proposed by Government differed in many important points from the existing Act. They had endeavoured to introduce into the measure nearly all the suggestions made by the select committee of 1867, besides some perfectly new clauses. The proposed Bill was entitled "A Bill to Consolidate and Amend the Acts relating to the Regulation and Inspection of Mines," and applied to mines of every description.

The previous Acts 5 and 6 Vic., c. 99, and 23 and 24 Vic., c. 151, and also 25 and 26 Vic., c. 79, were repealed.

The first clause of the working part of the Bill affirmed the principle of Lord Shaftesbury's Act, by providing that no women were to be employed underground. The education clauses of the existing Act were replaced by clauses providing that no boys were to be employed under the age of twelve, and that up to the age of sixteen their hours of work should be restricted to twelve in the twenty-four hours. The Workshops Act was incorporated in its entirety. Then nineteen general rules were inserted instead of the

fifteen in the existing Act. Among the new rules was one providing for the working of collieries in separate divisions or panels, having distinct communication with the down-cast and up-cast shafts; another prohibiting the use of gunpowder in fiery collieries where safety lamps were enjoined by the special rules. A rule was also introduced prescribing safety-holes or refuges in the inclines or rolley-ways underground; and another, that barometers should be kept at every colliery. The first general or ventilation rule was altered, and the saving words, "under ordinary circumstances," were struck out, so that the ventilating current was expected to be provided to meet even abnormal and unforeseen circumstances. A proviso was however added, to the effect that in case of accidents the owner or manager would be exonerated if the Court were satisfied that the needful measures of precaution had been taken. The words at the end of the general rules fixed the responsibility for carrying them out as follows:—"If the owner or agents of a coal and iron-stone mine acts in contravention of any of the foregoing regulations, he shall be guilty of an offence against the Act." Lastly, there was a clause providing that an owner or agent was liable to imprisonment, not exceeding three months, for wilful neglect endangering life or limb.

Quite a new principle was introduced in making owners or their agents *prima facie* liable for any breach of duty, and throwing on them the burden of proving their innocence in case of a prosecution. A short consideration of the clauses of this measure sufficed to convince both owners and workmen that it was unsatisfactory and even objectionable.

As soon as the Bill was printed it became the subject of keen discussion among the various associations of masters, mining engineers, and workmen throughout the country. The "Mining Association of Great Britain," the members of which comprised the majority of colliery owners, and many leading viewers, held meetings in London to consider the measure. They discussed it clause by clause, and eventually appointed a deputation to wait on the Home Secretary, in order to lay before him the alterations which they considered advisable. It was suggested and agreed, at the interview with the Home Secretary, that a conference should be arranged to take place between the members of the association and some of the Government inspectors to be nominated by the Home Secretary. Before this conference took place the Bill had been read a second time, but there seemed to be no desire on the part of the Government to hurry legislation. The measure as it had been framed was, in fact, a mere draft, subject to any reasonable alterations, whether emanating from employers or employed. The consideration of the Bill by the association of masters had led to the suggestion of many amendments; but the discussion on it by the workmen's delegates ended in the conclusion that it failed "to remedy any of the evils they have complained of for years," and this opinion was backed up by numerous signed petitions to the House of Commons against the Bill. The conference between the miners' association and the inspectors lasted three days, and ended by certain alterations in the Bill being agreed upon, which proposals were duly submitted to Mr. Bruce on the 10th of June, 1869. The views of the workmen had been

put before the Home Secretary by a deputation, which was introduced to him by Lord Elcho, and supported by several members of Parliament on the 1st of June.

The principal objections of the workmen's delegates were as follows:—They desired to limit the working hours for boys to eight hours instead of twelve hours per day, and that all boys of twelve years should have a certificate from a schoolmaster that they could read and write, before obtaining employment. They suggested that when masters made deductions from the wages for schooling, rent, or medical attendance, a correct account of such deductions should be given every six months. They objected to the option given to owners to gauge or measure coals, but desired to see all produce weighed by the imperial standard weights, and wanted to have it enacted that any owner preventing the workmen from placing a person to take account of the weighing should be guilty of an offence under the Act. Then they proposed a new clause, to the effect that every responsible manager should be provided with a certificate of competency. Of course, the favourite demands for sub-inspectors, and compulsory inspection of collieries once in three months, were also pressed. The masters, on the other hand, proposed the re-introduction of the education clauses of the existing Act. Instead of the restriction of labour for boys to twelve hours in the twenty-four, they proposed to substitute twelve hours' labour, with an interval of eight hours. The Workshops Act was not to be introduced at all; but a clause was to be inserted, enabling them to make certain deductions from the men's wages, such as cash advanced, rent, and charges for medical attendance and medicines. With regard

to the check-weigher appointed by the men, they considered that he should be liable to be removed at the option of the colliery owner. The clause introducing the panel system of working they proposed to strike out altogether. And they desired to alter the proviso at the end of the general rules, throwing the onus of satisfying the court, that all reasonable precautions had been taken, on the coal-owners, so that the masters should not be considered liable, unless it could be proved that all reasonable precautions had not been taken. They also proposed to omit the powder clause altogether, as well as the one providing that barometers should be placed at each coal shaft; and, in the case of arbitration, suggested that the costs should be charged as the court might direct, and not solely borne by the coal-owners. The deputation supporting this long list of alterations and suggestions had a lengthened interview with the Home Secretary, who did not accept any of the amendments proposed, and advised the deputation to place them on the notice paper of the House of Commons as soon as possible.

The day for taking the Bill in committee had been fixed for the end of June, but on the 19th it was withdrawn, and in replying to some observations of Lord Elcho, referring to recent colliery explosions and the serious loss of life caused by them, and asking for some additional security by the appointment of more inspectors, the Home Secretary stated that he had no hope of passing a satisfactory measure during the session, and thus legislation was postponed. Meantime the number of accidents at collieries did not diminish. Several disastrous explosions had occurred,

and the number of deaths for the year had increased by 105 beyond that of the previous year. At the miners' meetings and conferences these accidents and their causes were frequently discussed; and at a meeting of colliers, held at Manchester, a resolution was passed to petition the Government to appoint a Royal Commission to examine into the causes of the recent explosions at Ferndale and Haydock collieries. At this meeting some strong language was used, and one speaker (Mr. Macdonald) said that "every explosion was a crime." The principal remedy recommended by the colliers at this, and at all their meetings, was increased inspection. They relied on Government supervision to compel the colliery proprietors to adopt improved management. On the other hand, the inspectors, in their reports for 1869, did not advise any increase in the number of inspectors; but supported the plan of assistant-inspectors of good standing and education. Mr. Higson, in his report, makes the following pointed and apposite remarks:—"Much as the question of more inspection has been raised, and may be desirable, I have often thought that many of the casualties herein reported might have happened while I was in the mine. Often have I found men working in great danger for want of their places being propped and spragged, when props and sprags in abundance were lying out of use within a few yards." Most of those practically acquainted with underground workings will agree with these observations. Nearly all the inspectors in their reports from time to time alluded to the great want of discipline in collieries, which they had noticed in the course of their visits to the mines; and all pointed out the advisability, indeed the necessity, of

employing men of better information as overmen and underviewers. Indeed, the investigations into the causes of fatal accidents in collieries, from the first commission to Messrs. Faraday and Lyell in 1843, down to the present day, show a lamentable ignorance prevailing among a class of men entrusted by colliery proprietors with the safety of the men employed, and the security of their property. Many of the accidents on record may be traced directly to ignorance on the part of persons in authority; and, without going as far as Mr. Macdonald, and saying that ignorance is a crime, it must be admitted that the practice of entrusting the management of dangerous collieries to incompetent persons is highly blameworthy. Until recently a fallacious opinion prevailed, and may still exist, among coal-owners, that to be able to manage collieries and colliers underground it was necessary to be born on a pit bank and reared at a colliery. It is not so, however. The officers in charge of certain duties underground may be, and are, preferably chosen from among the steady and more intelligent workmen; but a modern colliery with its great depth, its extensive galleries, and large output,—entailing a complicated system of ventilation, the application of complex machinery above and below the surface, and the employment of a large number of workmen,—requires a more generally informed and scientifically trained mind than that of the usual workman, however intelligent. The want of education among mine-managers had been clearly and repeatedly exposed from time to time, ever since the causes of explosions, or the subject of accidents in coal-mines, had been at all inquired into; and the proposal to subject them to some test as

to knowledge had already been made by several Royal Commissioners. It had now been taken up by the workmen themselves, who have the deepest interest in securing good officers, as on them depends the safety of their lives underground.

The objection raised against this otherwise reasonable proposal was that it interfered with the right of masters to employ whomsoever they considered competent to manage their property.

This objection had to fall, in the following session, before the strong reasoning of Dr. Lyon Playfair.

During the commencement of the year 1870 the agitators in the colliery districts pointed to the procrastination, the almost culpable delay, of the Government, and urged the colliers to continue the demonstrations of the last four years until the desired end should be attained. The best, nay, the only, answer Mr. Bruce could make to these persistent appeals was to fulfil his promise of legislation ; and accordingly, on the 10th February, he brought in another Bill. The alterations made were inconsiderable, and more in accordance with the views of the owners than those of the men. The proviso at the end of the ventilation rule had been altered in accordance with the proposition of the Mining Association, the saving words being re-introduced. The proposed panel system was expunged, and proprietors desirous of removing an objectionable check - weighman might apply to a magistrate, who, on sufficient cause being shown, would give an order for the removal of the man. The costs in cases of arbitration were to be paid as the award should direct. This modified Bill was read a second time on the 21st of February, when Mr. Bruce

explained the leading features of his measure. Dr. Lyon Playfair powerfully advocated the adoption of a system of certificates of competency for colliery managers, attributing, in some measure, the frequent explosions and other accidents in coal-mines to the ignorance of those entrusted with the direction of colliery working. In this view, Lord Elcho, who strongly supported increased inspection, agreed. Mr. Elliot did not anticipate any great benefit from minute inspection, though he was not opposed to a general system of inspection.

With reference to the education of officers, he said, "The House would scarcely credit how difficult it was to find the right men—men who really understood their business;" but still he considered that the man who "had worked in the pit from early days," and therefore possessed experience, "was more trustworthy than a more scientific but less practical person." Many of the members connected with the mining interest took part in this debate, which, in the words of the Home Secretary, was of "an eminently instructive and practical character." The committee was then fixed for March 18th.

The hopes of all interested in having the Bill passed during the session were, however, not to be realized. The attention of the Ministry, and, indeed, the time of the House, were so much engrossed by important political questions, that the Mines Regulation Bill, after numerous postponements, was shelved for that session. Indeed, the discussion of the Bill involved more time than probably the Home Secretary had anticipated. The Mining Association held meetings and discussed the clauses, from many of which they

dissented, and sent a deputation up to the Home Secretary to enforce their views. On the other hand, the Bill was not more popular with the workmen, who, at their meetings, expressed a hope that Parliament would throw it out unless materially amended. Thus both sides interested in the question agreed to discountenance the measure, and meeting after meeting, followed by deputations, showed that it would be the subject of much debate in committee. Already in March, 1870, Mr. Bruce saw little hope for his Bill, although he committed it *pro forma* for the 25th of April, in order to introduce amendments and embody the Metalliferous Mines Regulation Bill. This measure had not received the consideration of Parliament during the session, attention having been solely directed to the Coal-Mines Regulation Bill.

On the 18th of March, however, Lord Kinnaird in the House of Lords, presented a Bill for regulating the metalliferous mines, but asked to postpone the measure, stating that the clauses specially applicable to metalliferous mines, would, in the course of the session, be included in the Coal-Mines Regulation Bill.

The Bill brought in by Lord Kinnaird presented no special features. The joint Bills, however, never came to be considered in committee, but were withdrawn on the 22nd of July, 1870.

During the year no accident of great magnitude occurred; and the inspectors' reports showed a decrease in the number of deaths through accident, of 125, as compared with the previous year.

Early in the year of 1871 the usual meetings of miners' delegates took place, discussing, in anticipation, the measure which was introduced to the House

of Commons on the 13th of February by Mr. Bruce. In doing so he explained that the clauses of Lord Kin- naird's Metalliferous Bill had been left out in order to facilitate discussion, and had been embodied in a separate measure. He then proceeded to explain the other modifications introduced into the measure of the previous year. The clauses most altered were those relating to the employment of boys, who were now allowed to commence work at the age of ten years, with the restriction that up to the age of thirteen they were to work underground only three days a week, and not more than twelve hours a day. Youths between thirteen and sixteen years of age to labour only fifty-six hours per week. The provisions made for education were, that every boy should attend school ten hours per week; and the teacher should have the power to apply for and get the schooling fees deducted from the wages of the boys. The ventilating clause was again altered, and the words "under ordinary circumstances" re-introduced. The two rules requiring the use of safety lamps in places likely to be dangerous were expunged, as well as the rule restricting the use of blasting powder. The penal clause, making a colliery owner or his agent liable to imprisonment for wilful neglect endangering life or limb, was retained. In referring to this clause, Mr. Bruce pointed out the injustice of inflicting a penalty of imprisonment, without option of a fine, on the workmen for an infringement of the Act, while owners or their agents were only liable to a fine; and, therefore, he had re-introduced the clause by which owners or their agents would be subject to imprisonment without the alternative of a fine.

Referring to Dr. Lyon Playfair's suggestion of requiring colliery managers to obtain certificates of competency by passing an examination, Mr. Bruce considered that it would be "far more dangerous than advantageous for the Government to interfere in attempting to influence the choice of agents," an opinion which the right honourable gentleman did not long adhere to. On the second reading of the Bill, on the 23rd of February, a discussion took place, in the course of which several members protested against passing the measure without further time for consideration. Many clauses were adversely criticised, and increased inspection, certificates for managers, and more stringent education clauses advocated. In general, however, the Bill received the support of those members who were practically acquainted with the subject. Mr. Elliot considered that the clauses dealing with the safety of miners could not be much improved. He, however, objected to the penal clauses, and trusted that Government would find it possible to remove them and impose fines, say up to £100 for owners and £10 for workmen, in lieu of imprisonment.

The Bill was committed for the 16th of March; however, when that time came, it was clearly impossible to proceed with it, and it was evident that both the mining Bills would be found among the *remanets* of the session. Meantime, the clauses were being vigorously discussed out of doors, and more especially the education clauses. The owners of thin coal-seams represented to the Home Secretary, through a deputation, the difficulty they would have to secure the labour of boys for their mines if the thirteen years' standard were adhered to. In fact, the owners gene-

rally opposed these clauses. Not so the workmen's delegates, who had organised a permanent committee in London, and who supported them strongly, coupled with a limitation of eight hours' work per day. The efforts the workmen made to introduce this restriction in the hours of work for boys, indicated that the support they gave to the education clauses was not given in the interest of education alone, but also with the idea of thus introducing the narrow end of a wedge which would enable them to force the masters into accepting the general limitation of working hours, so much desiderated by many of the men. In spite of agitation and energetic protests at the supineness of the Government, the end of the session was fast approaching, and the Bill had not been committed. It was pertinently asked why this delay was allowed, and how it was caused. Mr. Bruce stated in the House of Commons, "That hon. gentlemen would not let this or any other Bill pass." On the 17th of July, Mr. Gladstone included the Mines Regulation Bill among those which could not be satisfactorily disposed of. This announcement called forth numerous expressions of regret and disapprobation; and Mr. Disraeli observed, in promising his support to the measures, "That no Bills have been brought forward in which a larger number of people take a greater interest." The Home Secretary, under the pressure put on him from both sides of the House, proposed to refer the Bill to a grand select committee of forty members representing all the various interests, and thus narrow the differences which still existed. This proposition received the approbation of the owners, and nearly all the leading journals spoke in favour of

it; but the delegates of the men were not satisfied with this mode of settlement; and a deputation, composed of Messrs. Macdonald, Pickford, Burt, and Halliday, waited on the Home Secretary on the 24th of July, being introduced by Lord Elcho. They impressed on the right honourable gentleman the great want of confidence with which the mass of the miners regarded a tribunal composed in great measure of colliery proprietors and their friends.

On the 27th July, in reply to Mr. Liddell, Mr. Winterbotham said that the Home Secretary had decided not to refer the Mines Regulation Bill to a committee of forty, in consequence of the "opinion that had been expressed of the committee." After this statement there was no hope of advancing the measures in any way during that session, and they were withdrawn on the 9th August.

Shortly after the end of the session, namely, on the 8th of September, a mass-meeting of colliers was held at Barnsley, at which Lord Elcho spoke, supporting a resolution expressing the "injustice done them by Government in not passing the Mines Regulation Bill." This meeting was followed by others of a similar character, at which Government was severely censured, and the proposed committee of forty derided. All the speakers at these meetings dwelt on the necessity for sub-inspectors, certificates for managers, minimum age for boys underground to be fixed at twelve years, restriction of work to eight hours per day for youths under sixteen, standard weights to be used for weighing coals, wages to be paid weekly, and a Minister of mines to be created, with a seat in the House of Commons.

At one meeting a letter was read from Professor

Beesly, attributing the accidents in mines to "want of precautions on the part of the managers of mines, and excessive royalties charged by the landlords." Thus, in the eyes of many, the collier, with his grievances and the danger of his occupation, became an object of sympathetic interest—one whose hardships had not been duly recognized by his employers, and who deserved the special support of the Government. But the men were strong in themselves, as may be seen from the numerous meetings held by them during the years of discussion on the Mines Regulation Bill, and the perfect organization and agreement existing among them.

They showed no signs of abandoning any point in their list of grievances at the close of the session, and it was quite evident that the struggle over the expected Bill of 1872 would be quite as severe as that which had taken place previously. The year 1871 was not marked by any accident of unusual character, and the deaths, according to the returns of the inspectors, had been 1075, or eighty-four more than during the previous year.

The men, at the commencement of 1872, were more engrossed with discussing the eight hours' daily work movement, and the rate of wages, than in considering the future legislative enactments. No meetings on the subject were held before the 12th of February, when the Home Secretary introduced his Bill in the House of Commons. The measure this time contained some unexpected alterations and innovations.

The education clauses had undergone little alteration. The limit of age for boys remained at ten years; but the hours of work had been reduced to ten

per day. The hours for attendance at school, between the ages of ten and thirteen, were fixed at twenty per fortnight, instead of ten per week. The principal innovation was that providing that every mine should be under the control of a registered manager, holding a certificate of competency under the Act, introducing a number of clauses regulating the examination of candidates and the granting of certificates. To the surprise of many the ventilation rule was again altered, and stood once more in words of unconditional severity, without the sheltering phrase "under ordinary circumstances," or even a mitigating proviso. But at the end of the twenty-nine general rules was inserted the slender guard of an "onus probandi" proviso. Several new general rules were introduced providing for the employment of safety lamps, the use of gunpowder and other explosive substances, one providing for a daily underground inspection by the officers of the mine, and an occasional inspection of the workings by the men employed at the colliery. Another new rule provided that the roofs and sides of every working place should be made secure. The penal clauses remained unaltered, and all coals were, after the passing of the Act, to be paid by weight only, except under exceptional circumstances. The bill was read on the 12th February, 1872, and Mr. Bruce, in introducing the measure, dwelt at some length on the innovations he had introduced. The Metalliferous Mines Bill was read on the same day, and both measures were read a second time on the 4th of March.

The masters soon perceived that the Bill required careful scrutiny. They complained of the rule regarding ventilation, the clauses prohibiting or regulating

the use of gunpowder, which were considered mischievous by many authorities, and especially opposed the penal clauses. On the other hand, the Bill had the approval of the men, who objected to one clause only, viz., that one stipulating for a periodical inspection of the workings by the men employed. They argued that the inspecting men could not be independent agents in such a case, as they would risk the loss of their employment by giving an opinion of the condition of the mine adverse to the management. The differences between masters and men were so great that a fierce and lengthened struggle over the Bill was anticipated. To obviate this, it was considered advisable to hold conferences at which the different interests should be represented, and there to discuss the points of difference, and endeavour by mutual concessions to arrive at an agreement which would be satisfactory to all parties. Accordingly meetings were held under the presidency of Lord Elcho, in the month of March, at which the masters were represented by members of the Mining Association; the men by a delegate, and Government by two inspectors. These conferences resulted in unanimity on nearly all the questions at issue, and a report embodying the amendments was jointly agreed on. The Bill continued to be the subject of discussion in all the mining centres, and elicited the most opposite criticisms. Thus on the 10th of May, at a meeting of mine-managers held at Oldham, it was resolved that the measure ought to be entitled "A Bill for inflicting severe penalties upon managers and owners, and greatly increasing the cost of coal." Whereas a few weeks later, at a monster meeting of miners held at Durham, a resolution was

passed to the effect, "That this meeting begs to thank Her Majesty's Government for the introduction of the Mines Regulation Bill." It had been expected that the amendments agreed on by the members of the joint conference would be accepted by Government, and therefore great surprise was felt when the Bill came to be considered in committee, on the 21st of June, and it was found that but few of the suggested alterations had been adopted.

In the House of Commons, Mr. Stavely Hill expressed his surprise that the Bill remained in its vital points unaltered. It was evident that the so-called conference had overrated the authority given to the inspectors, and had not sufficiently weighed the anomalous position the Home Secretary would have been placed in had he delegated his authority to any body of men outside the House. The committee proceeded to discuss the Bill clause by clause. An attempt was made to prohibit the employment of women on bank tops, and to limit the age for the employment of boys to twelve years instead of ten; but these amendments were not successful.

Finally, all the educational clauses, and those referring to the employment of women and young persons, were agreed to with the exception that the age for children employed on the surface was changed from eight to ten years. The next clause at which a stand was made was the fourteenth, reciting the penalty for employing persons contrary to the Act, and the point raised was as to the insertion of the words "knowingly or wilfully," which were eventually inserted. The weighing clause led to some discussion, but was agreed to with a proviso added, to enable deductions

from weight to be made in case of coal being sent up from the pit mixed with stone or other foreign matter. The clauses relating to managers' certificates led to a good deal of discussion, and they were eventually struck out for further consideration. Although some verbal amendments were proposed and agreed to in various clauses, no principle was attacked until the consideration of the general rules, when Mr. Elliot rose to move an amendment to the first, or ventilation rule. He proposed to insert the words "under ordinary circumstances" and supported his amendment by an able speech. This amendment naturally raised a long discussion, which, however, terminated in an adverse division. The amendment was lost by 298 against twenty votes. But the discussion influenced Mr. Bruce in so far that he accepted the words "as far as practicable," and, at the suggestion of Mr. Elliot, the expression "reasonably practicable" was eventually adopted. A discussion also followed on the rule enforcing the timbering of galleries and working places, eliciting a promise on the part of Government to alter the rule. At the close of the discussion on the general rules, Mr. Staveley Hill proposed to alter the words throwing the *onus probandi* on the owners, and to amend the clause by making them only liable to conviction in case it were proved that all reasonable precautions had not been taken by the owner. The difficulty was met by adding a proviso relieving the owner from responsibility if he could prove publication and enforcement of the rules.

On the 9th July, the clauses regulating the appointment of examiners for certificates were brought in by Mr. Bruce, and agreed to. The Bill was

re-considered on the 11th, and read a third time on the 16th July, 1872.

The Metalliferous Mines Regulation Bill had been considered in committee on the 5th July, 1872, when no question was raised beyond that of the unfairness of deducting money from the men to pay for medical attendance, when often the doctors lived at such a distance as to be useless. Mr. Magniac, M.P. for St. Ives, proposed to give the power of appointment to the men ; but the amendment was not agreed to. The Bill was but slightly modified in committee, and that only in order to make it conformable to the Coal Mines Regulation Bill, and was sent up to the House of Lords at the same time as the Coal Mines Bill, namely, on the 16th July. Both bills were read a second time on the 23rd, when the Earl of Morley supported them on the part of Government. Lord Shaftesbury accepted these Bills as tentative measures, and trusted that they would tend to improve the condition of those, who, as the noble lord described them, "with all their faults are amongst the most generous, honest, and high-minded of our people."

Exactly thirty years had passed since Lord Shaftesbury fought the battle for women and young children employed in mines. He was not able then to pass so comprehensive a measure in the House of Commons as he desired. But the noble lord was the first member of the Legislature who made an attempt to improve the condition of the colliers, and to him is due the credit of removing one blot from the page of our domestic history, namely, the employment of women and girls underground.

Although Lord Shaftesbury on the second reading

of the Bill had announced his intention of not moving an amendment, when it came to be considered in committee, on the 26th of July, he did propose to alter the age at which boys were to be admitted to work underground to twelve years instead of ten. He explained that although prepared to accept the Bill as it had been brought up, he was not prepared to acquiesce in the amendment proposed on behalf of the coal-owners, and had, therefore, proposed amendments of his own. The question of age had, however, been so carefully considered in the House of Commons that the House of Lords did not disturb the clause as it stood, and after some discussion, Lord Shaftesbury withdrew his amendments on this point, as well as on that of a surgical certificate of strength and health for boys.

The Duke of Richmond carried an amendment in the clause regulating the responsibility of owners in regard to the special rules. The other amendments were of small importance, and the Bill was read a third time on the 1st, and received the Royal assent on the 10th of August.

CHAPTER IX.

THE ACT OF 1872—DIFFICULTY OF INTERPRETING SOME OF THE CLAUSES—CERTIFICATES OF COMPETENCY—SPECIAL RULES—COLLIERY ACCIDENTS—ELEMENTARY EDUCATION ACT—DEBATES IN THE HOUSE OF COMMONS.

IN 1873, soon after the Bill became law, the conditions of the measure became apparent. Although the workmen, at the divers meetings and assemblies they held during the year, expressed themselves perfectly satisfied with the Act, which in the words of Mr. Macdonald "gave them immense satisfaction," the owners and colliery managers everywhere took great and serious exception to many of the clauses. One of the most important points of dissension was that relating to the certificates of service to be held by managers. It appeared as if the Home Secretary had no clear conception of the class of men who were to hold certificates of manager. Early in the year a large number of underviewers and overmen, who had the practical responsibility of mine arrangements, applied for certificates, but were refused; and a considerable delay took place in the appointment of examiners, so that those prepared to obtain certificates of competency could not get them, and consequently a great number of collieries were being worked by managers holding no certificates, and consequently in unavoidable contravention of the law. At first it was evidently intended to give the certificates only to mining engineers and viewers. But to this course there were

many objections; even the men in some instances refused to work under the direct orders of engineers, preferring to depend for safety on the more practical underviewers. At the same time, many colliery proprietors shewed little discrimination in the choice of the men they recommended for certificates, sending in the names of overmen, firemen, and even butties, some of whom were unable to read or write. The applications were very numerous, as Mr. Bruce stated in the House of Commons in February that he had already received 3596 such applications. The difficulties of this question were fully appreciated by the Mining Association, who sent a deputation to Mr. Bruce, in February, suggesting amendments in the law. They proposed to provide for the appointment of two persons, to share the responsibility of management at each colliery; one to be the viewer or mining engineer responsible for the setting out of the workings and not necessarily resident; the other, the resident under-viewer, charged with carrying out the plans in detail and holding a certificate of second class. This suggestion was, however, not acted on; and the great majority of the applications for certificates were refused on the ground that only those who had the sole charge of a pit were entitled to them. The result of this action was that men who had charge of very small collieries got certificates, while others, often more competent, who acted as underviewers at large collieries were refused. The objection to the second grade of certificates was that by that system the management would be divided, whereas the spirit of the Act was to bring home to one person the sole responsibility. The controversy which ensued shewed that the under-viewers and over-

men were desirous of having this responsibility placed on their shoulders, whereas the viewers were as anxious to be relieved from it, while retaining the control of the general working of the collieries.

The difficulties which arose out of this vexed question led to a deputation of colliery proprietors and managers to the Secretary of State, in order to arrive at some understanding about the class of men who were to hold certificates. In the course of the interview with the Home Secretary, Mr. George Elliot mentioned the case of one of his chief viewers, who, having several collieries under his charge, refused to apply for a certificate, and preferred relinquishing his appointment to placing himself in a false position with regard to the Act, the wording of which required as a matter of fact the constant presence of the responsible manager at each colliery. The discussion which ensued turned on the intention of giving the certificate to the officer who had the responsibility of the management. Mr. Bruce, however, stated that he would prefer giving the certificate to the underviewer, if he were entrusted with sufficient responsibility by the employers to be fairly termed the manager.

The result of this deputation was a circular emanating from the Home Office to the inspectors, stating that underviewers were to be entitled to certificates of service, provided they had been practically responsible for the management of a whole mine during the prescribed period. A large number of underviewers availed themselves of this decision, and in a very short time the anomaly of managers directing collieries without certificates was removed.

The Government had already determined to

appoint sub-inspectors, but of the same standing as the inspectors, only younger men, and qualified in time to succeed as inspectors. One sub-inspector was appointed to each district to assist the inspector.

The colliery officials were much occupied during the year in framing new special rules, and some excitement was manifested among the colliers on the subject. Some colliery owners endeavoured so to frame the rules as to throw a great deal of responsibility on the men, which the latter opposed. The dissensions were more specially notable on the subject of propping. The deaths arising from falls of side or roof had always been more numerous than from any other cause, and hence the introduction in the Act of a clause compelling owners to see that the working places of the mines were properly secured. The attempt to saddle the men with the responsibility by special rules met with determined opposition on their part. The discussion on this subject between masters and men took an acrimonious turn in Scotland, and at one time a strike was imminent. This, however, was avoided; and at a conference of owners and men certain concessions were made, and the rules eventually accepted by the men. On this subject, also, a deputation waited on the Home Secretary, to elicit the proper reading of the sixteenth clause, when Mr. Bruce gave it as his opinion that the timbering was not to be taken from the men, but that "it should be done under the supervision and responsibility of the manager."

The weighing clause, as might have been anticipated, also caused considerable excitement. Many owners shewed some reluctance to adopt weighing machines on the pit banks. Whereas, in general, the

men were strongly desirous of having them. In Lancashire and South Wales considerable delay took place before the new system was introduced. The change consisted not only in the use of weight instead of measure, but in the substitution of the imperial ton for the long ton, hitherto in use, which varied in different districts. Before the end of the year the Act was fairly in operation in every district.

It is noteworthy that the thirtieth clause, giving the pitmen of a colliery the right of examining the workings, was rarely acted on, and few such examinations took place.

The year was remarkable for the great prosperity of the coal trade, and the consequent pressure to keep the collieries at full work. This condition of affairs may have had some influence in constraining the owners to comply readily with all the requirements of the Act. Coal had risen to such exorbitant prices that a Royal Commission was appointed to inquire into the cause thereof. By some, the high price of coal was attributed in part to the greater cost of raising caused by the Mines Regulation Act. This point was examined into by the commissioners, but the evidence did not show that any great increase of cost could be attributed to the new Act. Mr. Dickenson, inspector of mines, estimated the increase at 8d. per ton, and others at less. It was, however, given in evidence, that by limiting the labour of boys between twelve and sixteen years of age the working day was practically shortened, and the out-put of coal diminished, thus causing an increase in the cost of production of 1s. 4d. to 1s. 8d. per ton. On the other hand, there was strong evidence to show that the shortening of the

working day was more attributable to the eight hours movement, which had commenced before the passing of the Act, than to the measure itself. Almost all the witnesses agreed that it was beneficial to the community in general to keep boys out of the pits until the age of twelve, although Mr. Fisher Smith recorded his opinion that thereby the race of colliers would be "exterminated." Speaking of the effect of the Act, and the necessity for the clause providing for the proper support of the workings, Mr. George Elliot stated that in the north of England, where the timbering is put up by the owners, the deaths by falls of roof amounted to 1·30, whereas, in South Wales, where the support of the roof was entirely left to the discretion of the men, the death-rate amounted to 3·20 for half-a-million tons of coal raised.

No accident of any magnitude occurred during the year 1873, and the reports of the inspectors allude mainly to the difficulties encountered in carrying out the orders of the new Act. Referring to the certificates for managers, Mr. Wardell observes that this clause will ensure the certainty that managers can read and write, the employers hitherto not considering this a *sine quâ non*. The immunity from accidents noticed during this year was not of long continuance, for on the 14th April, 1874, an explosion occurred at the Astley deep pit, near Duckinfield, by which fifty-four men lost their lives. This calamity was made the subject of a careful inquiry on the part of the Home Office. It appeared that explosions had previously occurred at this pit, and that the condition of the mine had called forth remonstrances from the inspector. The inquiry disclosed a painful

laxity of discipline, as well as disorder in the management, and frequent change of officials. Gas was allowed to accumulate in the workings of an upper seam, which, through the subsidence of a tunnel, found its way to the lower workings and there exploded. The jury, while returning a verdict of accidental death, condemned the management, and gave expression to the opinion that the system of inspection was insufficient. This verdict gave rise to a discussion in the House of Commons, when Mr. Sidebottom moved for a Royal Commission to inquire whether a better system of colliery inspection could not be established. The motion was withdrawn, the Home Secretary promising to give the subject his attention.

The year was prolific of prosecutions against colliery owners by the inspectors for breach of rules, and some of these cases disclosed an unexpected amount of neglect, and even ignorance, on the part of the managers, and a dangerous recklessness on the side of the men. The clauses regulating the use of blasting powder were frequently evaded, and in one instance even iron prickers were found in use at a large colliery.

The great importance of care in the use of blasting powder was painfully exemplified at the commencement of the year 1875, by the explosion which occurred at the Bunker's Hill Colliery, on the 30th of March, resulting in the death of forty-three men. This explosion was attributed to the firing of a shot in a heading in the whole mine; and Mr. Dowdeswell, in his report to the Home Secretary, said: "The source of the gas which exploded must remain to some extent a

matter of conjecture, but there had evidently been a disengagement of gas from the floor of the mine in the immediate neighbourhood of this thirling." The presence of gas in the "immediate neighbourhood" of a place is in itself sufficient to render shot-firing in such a place a very hazardous operation.

It is, therefore, still open to discussion as to whether the blame of this accident should be laid on the shot, or on the imprudence of firing at all when the presence of gas "in the immediate neighbourhood" was, or at any rate ought to have been, known. The Bunker's Hill explosion led to some inquiries, and to a short discussion in the House of Commons as to the use of powder in coal mines, and the advisability of passing a Bill to prohibit it altogether in mines where safety lamps were in use. The subject was referred to the inspectors, but their opinions were so divergent that no line of action could be based on them.

Before the close of the year two severe explosions took place—one in December, at the Swaithe Main Colliery, near Barnsley, causing the loss of 143 men; the other at New Tredegar Colliery, near Newport, where twenty-three lives were lost. There was no direct evidence to show how the gas was fired at Swaithe Main, but it appeared that it took place near a large goaf; and it also was established that the charges of powder in the shots were exceptionally heavy, containing $2\frac{1}{2}$ lbs. of powder; and, moreover, that the colliers were allowed to take loose powder down with them, although it had been known, for some time previous to the accident, that gas was to be found in the mine—in fact, that careful attention to the details of management, so needful for the safety

of a fiery colliery, appears not to have been sufficiently exercised. The accident at New Tredegar was caused by a quantity of gas—which had accumulated through the imperfect working of a brattice sheet—becoming ignited at a defective safety lamp, or through the imprudence of one of the men.

During the year 1876 the Elementary Education Act was passed, which applies to all persons under fourteen years of age, and which the inspectors will have to enforce in the mining districts when it comes into full operation.

In the following year, 1877, a terrible explosion occurred at the Blantyre Colliery, in Scotland. By this event, 207 men were killed, and it was a marvel that such an accident could occur at a colliery where no cost seemed to have been spared to carry on the workings with all due regard to safety.

Various pleas were advanced to explain the disaster. The mine had been newly and rapidly opened out, therefore the coal was but little drained of gas, and work in the broken was carried on simultaneously with new work—the former with safety lamps, the latter with naked lights. Although the presence of gas had not been registered or reported by the fireman, some must have existed—sufficient, at least, to produce one of the most terrific explosions on record. This accident goes far to strengthen the arguments of those who condemn a mixed working with safety and naked lights.

Reference to the more recent accidents in coal mines cannot be made without alluding to the inundation of the Troedyrhiew Colliery, in South Wales. Most fortunately the irruption of water occurred at a

time when the men were out of the pit, only fourteen remaining underground. Nine of these were recovered alive—four on the day after, and five on the tenth day after the inundation—and five were drowned. The story of the confinement of the men in the recess of the mine between two floods of water, kept in equilibrium by a mere bubble of compressed air, and their rescue, reads more like a romance than the recital of facts. It was one of those events which outstep by far the limits of usual occurrences even among the dangers and vicissitudes of mining, and for a time formed one of the chief topics of interest of the day. The men were imprisoned, without food or light, and subject to a pressure of fifteen and a half pounds per square inch, for the ten days.

The accident elicited an amount of sympathy never equalled either before or since the Hartley Colliery disaster.

Her Majesty the Queen, and many distinguished persons, shewed their interest by repeated telegrams inquiring into the progress made for the rescue of the miners.

The spirit shown by the mining party in saving their comrades was deserving of the greatest admiration, and their intrepidity, amounting to heroism, evinced that feeling of brotherhood common to men associated in facing difficulties and dangers together. Nor were the working miners the only men who gave evidence of courage and zeal on this occasion; owners, managers, and medical men assisted the inspector in his arduous duties, and joined their efforts to save the lives of the unhappy prisoners. These efforts were not allowed to pass without recognition, for the

more prominent actors in the rescue were rewarded with the Albert medal.

During the beginning of the year 1878 a series of calamities occurred in collieries. The country was startled by a succession of explosions, and the month of March was marked by no less than four. At Kersley, forty-three men perished; at Borwood, sixteen men; at Unity Brook, thirty-five; and at the Chesterton collieries thirty men lost their lives; making a total of 124 deaths from gas explosions within the short space of one month. Early in the year the subject had been brought before the House of Commons, and the Government urged to take some action with reference to the use of powder in fiery collieries, either by bringing in a Bill to prohibit the use of explosives altogether in such mines, or imposing more stringent regulations. The Home Secretary expressed himself averse to disturb the Act of Parliament, which he considered was working well. On the 14th March, in reply to a question, he shewed from statistics the gradual diminution of accidents and deaths since the system of mine inspection had been adopted. But the continued recurrence of colliery explosions, and more specially the Haydock accident, by which 195 men perished, induced Mr. Macdonald to move a resolution in the House of Commons to the effect that "it is expedient that the Government should at once take steps to see that the inspection ordered by the Mines Act, 1872, be vigorously enforced. That should the powers contained in the above-named Act be insufficient to meet the necessities of all cases, the Government ought to introduce without delay a measure that will."

An interesting discussion followed; and in the course of an exhaustive speech the mover of the resolution expressed his perfect faith in the Act of 1872, but urged that the loss of life had been frequently attributed by juries and inquiries to the recklessness on the part of owners and managers, and that the mode of inspection was illusory, for if the law were vigorously carried out accidents would not so frequently happen. He submitted that the inspectors ought to visit the mines more frequently, and make weekly or monthly reports. He argued that blasting ought to be prohibited in fiery mines, and gas not allowed to accumulate in the goaves or wastes. But, above all, that the certificates of managers ought to be cancelled in cases where neglect or incapacity had been proved.

Mr. Burt considered the Act of 1872 one of the best ever passed, and thought that there would be little necessity for any new legislation if all the clauses were strictly enforced, citing the Blantyre explosion as an example of gross negligence and violation of the Mines Regulation Act. Referring to the thirtieth clause, which gives the workmen the right of making periodical examinations of the mines, he said that the inspection of a large colliery involved a considerable time, and, therefore, the men did not avail themselves so frequently as might have been expected of this permission. Then, alluding to blasting powder, he considered its complete prohibition, as well as the universal introduction of safety lamps as unnecessary, and even mischievous. The sparse light afforded by a safety lamp would, in all probability, tend to increase the number of fatalities through falls of stone

or roof, the greatest source of death underground, as since the year 1851, the number of men killed by falls had been 11,000, as compared with 6000 who had perished through explosions.

Sir George Elliot elaborated his theory of a zone of greatest danger, which he fixed at a depth of from 400 or 500 to 1200 ft., and this zone he considered might be placed under some special supervision ; but he did not agree with minute inspection, as a too stringent measure would only hamper the inspectors of mines. With reference to the question of blasting the coal, he considered that naked lights ought not to be used where inflammable gas existed ; pointing out how very much greater the consequences of explosions at present were, when compared to those of former days, when perhaps only forty or fifty men were employed underground instead of the hundreds now found in a large colliery. He did not think the Act had materially increased the cost of raising coal, and should like to see a Royal Commission appointed to enquire into the effect of the Act as regards that point. In conclusion, he observed that the remedy "best conducive to the safety of the mines was the abolition of gunpowder in fiery mines."

Dr. Lyon Playfair referred to his own experience as proving the prevalence of ignorance among those entrusted with underground duties, and urged the importance of knowledge in those entrusted with responsibility.

Other speakers agreed as to the benefit already derived, or to be derived, from a system of colliery inspection, but the majority condemned the use of blasting powder in fiery mines. Mr. Cowen suggested

that a fund ought to be organised for the relief of the families of men killed by colliery accidents, the money to be raised by levying a small tax on the coal sold and a percentage on the earnings of the workmen. He also referred to the advisability of giving great publicity to the meteorological conditions of the atmosphere in the colliery districts.

The Home Secretary, in reviewing the debate, repeated the statement that accidents had greatly diminished since the passing of the Act. He looked on the certificate of colliery managers as quite as important as those granted to masters of vessels, and had always given instructions to prosecute managers when there was sufficient cause for doing so; but, for safety, it was necessary to depend mainly on the responsibility of employers and employed. He repudiated the view that inspectors were not to visit a mine unless an accident had occurred, and he had issued "consolidated instructions" to the inspectors on that subject.

These instructions enjoined on the inspectors to examine a mine on invitation or complaint; to pay attention to anonymous complaints without divulging the source of their information; not to send notice of intended visits to mines unless advisable to do so; and to examine mines as frequently as possible without announcing their intention, as the liability to an official inspection without previous warning might be a most effective prevention of abuse. Lastly, that a record should be kept of the inspections and the results obtained.

As regards blasting, he had pressed on owners to discontinue the use of powder; but he found that the

objection to its disuse came more from the men than the owners. His impression was, that the cost of coal getting without powder would not be much increased, and that blasting should be abandoned. It seemed to him inconsistent to prevent the farthing candle, and permit the blast. The time had not come for a Royal Commission; attention had been much directed to the subject during the past twelve months, and public opinion was ripening. The Home Secretary again reverted to the necessity of depending on the men to carry out the rules, and agreed with Dr. Lyon Playfair that better education among the miners would be attended with good results.

The debate ended in the withdrawal of the resolution, but it had the important result of giving those most conversant with the subject the opportunity of expressing their views.

The subject was not allowed to drop, and before the end of the session Mr. Macdonald again brought it before the House, with reference to the Haydock Colliery explosion. This ill-fated colliery had been the scene of several disasters. In 1868, twenty-six men were killed by explosion; in 1869, fifty-nine; and on the 7th June, 1878, 195. The evidence given at the inquest of the last explosion showed a want of ventilation, and that gas had been allowed to accumulate in the goaves. Mr Macdonald referred also to the explosion near Barnsley, where 143 men were killed, and the coroner's jury had found that the general and special rules had been disregarded. At Blantyre Colliery, also, where 209 men were killed, the rules were disregarded, yet no steps had been taken to punish the managers. He affirmed that these constant

disasters were producing a feeling of grave discontent, and called on Government to institute an active system of inspection and enquiry, and to take measures to have the offenders against the law punished.

According to Mr. Lowthian Bell, the inspectors had too much to do. He also pointed out how little gas in a coal mine was necessary to produce terrible results by explosion, and the necessity of having always a large excess of ventilating power.

Mr. Burt observed that in most cases explosions were explained by sudden outbursts of gas, whereas a magazine of gas existed in the goaves of the mine. He was quite satisfied with the action of the Home Secretary, but thought that in the cases of Blantyre and Haydock, where continued mismanagement, or, at least, very bad ventilation and laxity of discipline had been proved, it would be right to suspend the certificates of the managers.

The Home Secretary, without entering fully into the question on this occasion, made a very important statement as to the clauses of the Act which referred to managers' certificates. He desired to have it fully known all over the country that the Government intended to place managers of collieries on precisely the same footing as the captains of vessels; and again, in the course of his observations, he said that "most persons looked on that part of the Act as a dead letter; but he wished to prove that it was a living reality."

It has been thought advisable to quote these debates somewhat at length, as they shew the opinion of those best versed in the subject. It is clear that the majority of the speakers attributed the causes of colliery explo-

sions to the use or abuse of blasting powder in fiery mines, to the use of naked lights, and to the want of a more stringent inspection, coupled with a greater severity in carrying out the provisions of the Act as regarding managers.

Before the end of the year another explosion occurred at the Abercarn Colliery, in South Wales, where 280 men perished.

The colliery, which is an extensive one, was under unexceptional management, and the ventilation admittedly good. In the month of July a deputation of colliers had examined the workings, and their report was satisfactory. In August the inspector had visited the colliery, and did not apprehend any danger. Most of the witnesses at the coroner's enquiry spoke to the sufficient ventilation and good management, and attributed the disaster to a sudden outburst of gas in quantity. Mr. Cadman, the inspector, gave his opinion that some derangement in the ventilation had taken place. It was also given in evidence that falls of roof had been recorded by a fireman on the morning of the explosion, and it might be inferred that the gas in the goaf had been suddenly pressed out into the working face. The manager, Mr. Gordon, in his evidence, stated that when in the pit, shortly before the explosion, he noticed some gas "in a hole in the roof, just over the front wall of the gob, in one of the faces which was coming from a feeder." Possibly a fall in the gob or goaf might have brought down not only the roof, but the gas as well.

This accident, however, belongs more to the passing events of the day than to the annals of coal mine inspection. It is sufficient to record that the

coroner's jury, after a lengthened and careful enquiry, returned the following verdict :—"That, in the opinion of the jury, the death of John Hall was caused by an explosion of gas at the Prince of Wales' Pit, Abercarn, but that how it occurred there is no evidence to show."

It is a sad reflection that these pages should close with the record of one of the most fatal explosions which ever happened in coal mines. It might almost appear as if the labours of the last twenty-eight years had been fruitless, and that, in spite of our system of inspection and the many great inventions and improvements brought into use from time to time, explosions must still continue as numerous as ever. But to arrive at an appreciation of improvement in such matters, it is necessary to take averages extending over a number of years, and not an exceptional period, such as the year 1878, which will be painfully memorable from the number and magnitude of the calamities which have occurred, not alone in our coal-pits, but on our railways and to our ships.

It seems as if certain cycles of irresistible misfortune were predestined, and that, let us endeavour to control the laws of nature as we may, some force above the intelligence of man exists which baffles his perception.

CHAPTER X.

RETROSPECT—WORKING OF THE ACT OF 1872—EXAMINATIONS FOR MANAGERS' CERTIFICATES—PROPOSED SCHEME FOR TWO CLASSES OF CERTIFICATES—THE USE AND ABUSE OF BLASTING POWDER—COMPARATIVE DEATH-RATES THROUGH ACCIDENTS—GENERAL REMARKS.

SINCE the first passing of an Act relating to coal mines in England in 1842, great changes and improvements have taken place in the condition of the mines and the miners. Although the results obtained by colliery legislation may not equal the anticipations of the most sanguine, yet, if we compare the state of the colliery world in 1842 with that in 1878, it must be admitted that vast strides in the right direction have been made. The first Mines Bill grew out of the great movement which took place in the beginning of the century for the improvement of the operatives. Rumour at that time had carried dismal tales of woe and suffering among the factory workers; and the agitation of a few determined men led to official investigation and legislative enactments. In one of the reports on the factories of the Midland counties in 1833, the condition of the colliers was incidentally mentioned. This led to some further inquiries, and eventually to the appointment of a Royal commission on the employment of women and children in the mines. The immediate effect of the startling dis-

closures contained in this document was the introduction of a Bill by Lord Shaftesbury (then Lord Ashley) to prohibit the employment of women and children, and regulate the employment of boys in mines. The Bill was passed, after a determined opposition on the part of the colliery owners, during the session of 1842. By this Act women were altogether prohibited from underground employment, as well as boys under ten years of age. Provision was made for the appointment of mine inspectors, and the term of apprenticeship of boys was limited to eight years. It is remarkable that in this first attempt at legislation a clause was inserted prohibiting the payment of wages at public-houses, but no attempt was made to touch the question of prevention of accidents. The clause as to the payment of wages was received with incredulity by the men, because the Truck Act had long been passed, and always remained a dead letter. A mine inspector, called a commissioner, was duly appointed, but his duties were confined to occasional visits to the different colliery districts, where he made enquiries as to the condition of the workpeople, and endeavoured to enforce the provisions of the Act with the slender powers at his disposal. His duties did not embrace the investigation of accidents.

The frequent explosions of gas at collieries, and the great loss of life caused by them, had attracted public attention, and men of science had investigated the causes of these disasters, and had endeavoured to devise means for preventing them. As early as 1760 the steel mill had been invented to produce light without flame. A safety-lamp had been suggested by Humbolt in 1796; and in 1813, Dr. Clanny's original

lamp was tried underground. The efforts in this direction led to the more brilliant inventions of Stephenson and Davy, the prototypes of the numerous safety-lamps now in use.

Accidents, however, continued to occur, and the Government, in 1835, appointed a committee of the House of Commons to investigate the subject, and report. A few years later, in 1839, a committee of private gentlemen was formed, at a public meeting held at South Shields, to investigate into the causes of accidents in coal mines, in consequence of the great loss of life by an explosion at the St. Hilda Colliery in that year. This committee continued its labours over three years, and published a most valuable report in 1842.

In the year 1843 an explosion occurred at the Haswell Colliery, and Government appointed Messrs. Lyell and Faraday to enquire into the cause of the accident, and report their conclusions.

Both the committees and the commissioners, among other recommendations for the prevention of colliery accidents, advised some system of underground inspection and Government control over colliery management. This proposition met with disfavour at the hands of the colliery proprietors, who viewed any official supervision as legislation of an inquisitorial character. The loss of life underground continued to be so considerable that the subject was referred to a committee of the House of Lords in 1849, who, after a careful investigation, recommended that Government inspection be resorted to. Accordingly an Act was passed, in 1850, for the inspection of coal mines in Great Britain. This

measure made it lawful for the Home Secretary to appoint inspectors, with powers to examine the workings of collieries, and to report to him from time to time. The colliery owners were also compelled to give notice of each fatal accident to the Home Secretary. The old Act was not repealed, and thus the coal mines of the country were placed under two distinct systems of inspection—one having for object the condition of the employed, and the other their safety. This Act was passed for the term of five years, and renewed in 1855, when, in order to give greater safety, a series of seven general rules to be observed in the underground management were incorporated; and it was enacted that at every colliery a code of special rules should be adopted for the guidance of the overmen and colliers, drawn up to meet the requirements of the different modes of working the coal: the powers of the inspectors were also increased and their duties were clearly defined.

In 1860, when the Act was renewed, and called "An Act for the Regulation and Inspection of Mines," the first attempt at educating the colliery boys was made by prohibiting the employment of boys under twelve years of age, unless provided with a certificate from a competent schoolmaster that they could read and write, or bring proof of attending a school for three hours on two days of each week. This Act did not satisfy the large majority of the working colliers, who shortly after it became law began to agitate for more legislation. In 1867 they sent up to the House of Commons a numerously-signed petition, complaining of the "low social condition" of colliers, which they attributed to want of

opportunity of educating their children, and representing the measures passed by the legislature so far as "inadequate for securing the personal safety of the miners."

From this time a period of combination and agitation among colliers was entered upon. The men, led by demagogues—in many, nay, in most, instances, sincere and disinterested—formed associations in different localities with the same general object of fighting for what they considered their rights, and against what they considered their grievances. Although frequently the views of the men were unreasonable, it must be admitted that these assemblies of working men were, as a rule, conducted with a moderation and a spirit of fairness which did them infinite credit, and called for the approval of those most opposed to them. The result of this concerted and indefatigable agitation certainly was the introduction in the next Act of Parliament of most of the clauses advocated by the colliers, in a more or less modified form. The men supported the education clauses, more stringent safety rules, increased inspection, and payment of coals wrought by weight instead of measure. The new Bill brought before Parliament in 1869 was not passed until 1872, when the present Mines Inspection and Regulation Act, under which the collieries of Great Britain are at present worked, became law. The more remarkable features of this Act are the novel clause compelling responsible colliery managers to pass an examination of competency, new stringent rules regarding the use of blasting powder in fiery mines, and the support of the roof in all main roads and working places. The education clauses

extend to boys up to the age of thirteen; owners are compelled to weigh the coals, except under certain circumstances; and generally the Act is more stringent and more onerous on the colliery owners. The Act was not received with much favour by colliery proprietors; but, to use the words of Mr. Macdonald in the House of Commons, it "gave the mining population immense satisfaction." It has not, however, proved a perfect security to the men working underground, and several of the clauses have only been practically interpreted with very great difficulty. There is a notable want of congruity in the Act as it now exists in many points. By the system of inspection every inspector is an autocrat in his district, interpreting the Act to a great extent according to his own particular views. From this ensues a great difference in the management of collieries.

In spite of the care with which the use of blasting powder is regulated by the Act in fiery mines, it has frequently been so imprudently used as to cause severe explosions, entailing great loss of life.

The deaths caused by miscellaneous accidents under ground are also very numerous, although the general rules to be observed in collieries are so complete that it would be difficult to devise any more. If these general rules were only carried out in practice, there can be no doubt but that the result would be a marked diminution of fatal accidents.

On the other hand, the practical inspection of collieries appears also to leave much to be desired; and it seems that either the inspection is not uniform or the inspectors are too few in number, or else they are saddled with such divers duties, that they have

not sufficient time at command to make frequent examination of collieries.

Then, again, the boards of examiners differ widely in the standard they adopt for the examination; hence, a difference in the amount of knowledge required from the candidates in different districts. The original object of instituting independent local boards was to meet the diverse requirements of men who had obtained their practical knowledge of mining in the different coal-fields. But, although there is undoubtedly a wide difference between the various methods of working coal according to the nature of the seams—although fiery collieries of the North of England require a different system from non-fiery collieries of South Staffordshire, and the pillar and stall is dissimilar to the long wall method of working coal—the general principles of applied science are in all cases the same.

In order to make the working of the Act more consistent, the idea of a ministry of mines has been often mooted. For some reasons it might be advisable to have some central authority; not, perhaps, a ministry of mines, but a department of the Home Office specially devoted to the questions arising out of the working of the Act of Parliament, or a separate office at the Royal School of Mines under a head inspector. Such a central organisation would have the advantage of collecting information from the various districts into one focus, where it would be always available. Through the agency of such an establishment the reports of the inspectors, and other documents, might, perhaps, be placed in the hands of the public at a somewhat earlier date than is

usual at present; and that in itself would be a great advantage.

It might, also, by introducing an uniform method of compiling the statistics, facilitate the labours of the inspectors and relieve them of some of their labours, thus giving them more time to devote to the examination of mines.

Special reports might be sent up by the inspectors from time to time, not necessarily for publication but for reference in case of need; and, generally, the vast amount of statistical and other information now scattered over the country, and to be found only in the hands of the inspectors in their different districts, might be collected and compiled, and made available for reference.

Owing to the mode in which the examinations for managers' certificates are held, there exists a notable inequality in the standard of knowledge required from the candidates.

Ever since these examinations have been instituted a great diversity of opinion has shown itself; both as regards the matter of the examination, and the class of persons who were intended by the Act to hold the certificate of competency.

The Act directs that the responsible manager of a coal mine ought to hold a certificate of competency. He is placed in the same position as the master of a vessel, and can only hold his position as long as he retains his certificate, which may be cancelled or suspended in case of incompetency or gross neglect being proved against him. But who is the responsible manager?

In large collieries the management is practically

divided among a number of officials, all acting under the general direction of a viewer, who may or may not be resident. In most cases he is not so, and has the supervision of a number of collieries. He naturally leaves the carrying out of his plans to others, such as under-viewers or overmen.

For some time after the passing of the Act a controversy was kept up as to which of these officials was to hold the position of responsible manager. It was eventually decided by the Home Secretary that the overmen were qualified to hold certificates of service and competency.

But since then the examining boards—following the tendency of all educational bodies—have from year to year raised the standard of the examination, and required a greater amount of knowledge from the candidates; so that, at present, few overmen could obtain a certificate of competency in any district, although, at the same time, from a professorial point of view, the standard is not very high.

It must be remembered that the greatest possible difference exists in the extent, difficulties, and dangers of collieries; and that, consequently, the requirements in knowledge and experience needful for the management of mines must vary with the difficulties to be overcome.

A man, quite competent to conduct the workings of a small non-fiery pit, would be utterly out of place at the head of a large and fiery colliery.

It might, perhaps, be permissible to suggest, in order to avoid the inequality of the standard of examination which must exist in the present system—and, at the same time, while demanding a high degree

of knowledge from those who are destined to take the responsibility of managing large works, not to exclude from the list of certificates the trustworthy, practical men who act as overmen—that two classes of certificates might be established. It may be assumed that it would be advisable to exact some measure of knowledge even from the men who act as underviewers and overmen, but do not take the direct responsibility of management. It might, therefore, seem judicious to divide the examination into two parts: one on the practical subjects relating to coal mining, and the other on the applied science necessary for the higher branches of mine engineering.

The first or practical examination should be local, and held in the different colliery centres as at present, and should embrace all the subjects pertaining to the practical working of coal, and the discipline of collieries. The candidates should not be required to know more than the rudiments of applied science, such as can be acquired by intelligent diligence in the course of practical experience. A certificate of having passed this first examination should be made a necessary qualification for the position of overman; while for any one who aspired to become the responsible manager of a large colliery, it should be further necessary to obtain a certificate of the higher class; but every candidate for the second or higher examination should be required to possess the certificate of practical competency given by the local examiners.

The second or higher examination would be held in London, and might be brought within the scope of the Royal School of Mines. By this means, some sort of status would be given to a class of engineers whose

duties embrace a greater variety of works than any other. The mining engineer has not only the grave responsibility of underground safety, but has the laying out of miles of railway above and below surface, the designing of intricate ventilating, pumping, and winding machinery; he has to contend with fire, water, and the support of immense weights of super-incumbent earth, and the raising of millions of tons of coal.

In the carrying out of the necessary works for the exploitation of a large colliery, he requires more varied knowledge than is needful in any other branch of engineering. It seems strange that in a country like England, where the great industries are directly dependant on the produce of the mines—where, in fact, the existence of immense masses of coal and iron ores has been the prime cause of a commercial success far above that of any other country—the men who direct and control the enterprises which have for their object the discovery and utilization of these natural riches are undistinguished save by an indefinite title.

There exists for them no central institute which can confer a diploma of universally recognized rank or membership, or serve as a place of union where their varied and valuable experiences may be compared and recorded.

The holders of certificates of practical competency, although intended to act as under-viewers or overmen, might also become the responsible managers of small and not dangerous collieries, on the recommendation of the inspector for the district, and with the consent of the Secretary of State or any central authority which may be instituted.

The consideration of the use of blasting powder in fiery collieries is one which requires great attention. It would never do to countenance the continuance of any system which was in itself dangerous, and likely to cause the loss of life. On the other hand, if the system were only dangerous when applied without proper precaution, it would be unfair to condemn it.

It might be shown that to wedge down coal instead of blasting it would be actually to the advantage of the colliery owner, on account of a greater production of large coal ; but this would be evading the question, which refers only to the safety or non-safety of blasting powder in fiery coal mines.

The presence of any naked light is a danger in the presence of explosive gas, whether a farthing dip or the flame of a shot. But it must be admitted that even a mine yielding inflammable gas can be so ventilated as to be secure from explosion under ordinary circumstances ; and, if so, a naked light ought to be safe if used with circumspection.

A good light is invaluable for the prevention of accidents by falls of roofs and sides, but this is no argument for the disuse of safety lamps. In a mine yielding explosive gas, any trivial accident may cause an accumulation of gas, or sufficient may lodge in a crevice or hole to produce an explosion, and it is therefore expedient to guard against such an occurrence by providing the men with a comparatively safe light. But in the use of blasting powder, in fiery mines, it is contemplated to expose the naked light for only a short space of time, and in parts of the mine which are free from gas.

The general rule in the Mines Regulation Act relating to shots very clearly points out the circumstances under which powder is to be used, and the precautions to be observed in using it.

A competent person is to "examine the place where it is to be used, and the *places contiguous thereto*, and shall not allow the shot to be fired unless he finds it safe to do so."

It does appear that this rule ought, if strictly adhered to, be sufficient to guard against the dangers of the use of powder. It is manifest that in a mine peculiarly subject to "blowers," or sudden discharges of abnormal quantities of gas, the use of powder—in fact, the presence even for a short space of time of any naked light—ought to be prohibited. But such circumstances are exceptional; and it would be unfair to impose regulations on the great majority in order to meet the dangers of a few collieries. Indeed, most of the explosions directly traced to the firing of a shot have occurred where gas has been proved to exist, if not at the place where the shot was fired, at least in places *contiguous*. It may not be out of place here to quote the words of one of the inspectors (Mr. Hedley), used at the investigation of an explosion at a colliery in Lancashire. He remarked that: "If people *would* continue to use gunpowder near gobs full of gas they might be pretty sure to have accidents."

To hope for complete security in the prosecution of so dangerous an occupation as mining would be futile, but it is reasonable to expect that well-known dangers should be avoided by the means at command. The management of a colliery consists in strict attention to the details of the work; and, as this attention

is more or less careful, the safety of the mine will be greater or less. No scientific invention nor specific rules will ensure the safety of collieries; this is to be attained by constant watchfulness on the part of all engaged, and a most careful attention to the ordinary details of routine in carrying out the work, according to systems dictated by knowledge and founded on experience.

As far as explosions are concerned, the remedy which would suggest itself to the ordinary mind would be simply to clear the mine of the dangerous gas.

This simple proposition is a very difficult one to carry out in practice; yet, with the powerful appliances of modern invention, in the shape of mechanical ventilating machinery, almost any quantity of air can be forced into or pumped out of underground workings. But in many large collieries there exist large tracts of cavernous wastes, from which the coal has been extracted, denominated goaves or gobs, where the gas exuding from the strata is allowed to accumulate, thus forming vast reservoirs of inflammable air. At periods of lower barometrical pressure the gas expands, and flows out from these forlorn recesses into the main arteries of the mine, playing, as it were, along the edges of the goaves, and ready to ignite at any naked light it may come in contact with. A sudden fall of the barometer, or a break in the superincumbent strata in the waste, may force out a sufficient amount of explosive gas to vitiate a whole mine. Then again, the firing of a shot, more especially if it blows out the steaming, may cause such a vibration in the air underground as to cause a large influx of inflammable gas into

the working places of the mine. The danger from such a cause is self-evident, and was pointed to as the main cause of explosions by Messrs. Lyell and Faraday as long ago as 1844; yet the ingenuity of colliery agents is spent on endeavours to control and repress this element of danger, instead of making efforts to prepare an outlet for the accumulated gas, and remove it altogether. The question of cost is necessarily an element in all schemes for mining operations; but the cost of a special air-way to drain the goaves of a large mine cannot be so great as to weigh against the possibility of an explosion.

The great aim of a colliery viewer—the acme of good management—is to have the workings of a colliery so clear of gas and so safe that men might work with naked lights, and the coal be blasted down with impunity. This end cannot be attained in some coal mines owing to the existence of “blowers,” that is to say, compressed gas in the coal or strata; but in the majority of coal mines the flow of gas from the coal is sufficiently regular in amount from day to day to enable the necessary quantity of air to be estimated, and the gas consequently diluted and rendered harmless. In the case of many great explosions it has been a difficult matter to explain the presence of sufficient gas to produce the terrific results, the goaves being bricked up, and the edges ventilated by a current of air, and yielding little or no gas in ordinary. But supposing a sudden fall of strata to take place in the interior of the waste, or an abnormal fall of the barometer, or a violent vibration caused by a shot, and out comes the insidious gas, floating rapidly on the ventilating current and mixing with the common air,

until suddenly the dangerous mixture meets with some naked light in a part of the mine considered safe, and at once explodes. To explain such occurrences, far-fetched theories are frequently propounded, and often they are simply attributed to the use of powder for blasting the coal. It is difficult to understand how this theory can be in all cases supported if the rules laid down for firing shots are duly observed. It is supposed, however, that a shot will liberate a sufficient quantity of gas to cause an explosion; but it is difficult to conceive how this gas can become sufficiently mixed with common air to form an explosive mixture in the short space of time required for the action of a shot.

That the pressure of the atmosphere has something to do with the presence of air-damp in mines is shown by statistical records. For instance, during a low state of the barometer between the 10th and 13th of December, 1866, no less than six colliery explosions occurred, among which was the terrible calamity at the Oaks Colliery, by which 360 men perished.

It must not be supposed that with a falling barometer the gas in a coal seam or the goaves of a colliery rushes out at once. It takes some days before a sufficient quantity exudes to become dangerous; and it is not at times of violent oscillation of the barometer, but during a continued low pressure, that the greatest danger is to be apprehended. There is also a system of ventilation adopted in continental collieries, which may be termed the ascensional, and which consists in taking the return air always from the rise of the workings; that is to say, giving the lighter carburetted hydrogen the facility of draining in the direction of its

density. The natural escape for fire damp is as much towards the rise as that of water is towards the dip. This principle, although so well recognised on the continent that on it is based one of the general rules laid down for the management of fiery collieries, has never been sufficiently appreciated in this country.

The accidents in coal mines caused by the firing of gas appeal more to public sympathy than other causes of death, but they do not occasion the greatest loss of life. The fatalities through falls of roof, though not so conspicuous, are much more numerous. These accidents depend, as a rule, on the want of care of the colliers themselves.

In nearly every case they are caused by the workmen neglecting to use the pit timber supplied to them for the purpose of propping. It has been abundantly proved in practice that in those collieries where the roof is timbered and secured by special men paid by the owner for the purpose, the deaths from falls of roof are much less numerous. By making the owner responsible for seeing this done, either directly or through the colliers, the Act has done all that legislation can do to secure safety. It is to be hoped that in this, as in all other dangers directly depending on the colliers, amelioration will follow on better education. From this point of view the education clauses are not too stringent, as, instead of a reckless, ignorant set of colliers, we shall have a class of steady, careful workmen, more alive to a sense of danger, and more intelligent in their work. Although the restriction on youthful labour in mines has now been in action more or less for the last twenty-eight years, there is no diminution in the

number of colliers, and no depreciation in their working capabilities to be recorded.

It is not intended to assume that scientific discoveries may not naturally diminish the risks of mining. Science has already done a great deal in that direction, and more may be expected as knowledge and discovery advance. Mr. Buddle, the most eminent viewer of his day, rested *his hopes* of greater safety in the working of mines on the efforts of men of science, and his opinion has been amply justified by the many inventions and new appliances which have been introduced in mining with beneficial results.

It is not chimerical to hope some day to see a perfectly safe light introduced in the fiery collieries through the means of dynamic electricity.

The possibility of discovering some chemical substance which will have an explosive effect without giving a flame, or requiring one to act, must also be admitted. Machinery may eventually be successfully applied to coal cutting, and thus do away with many of the casualties through falls of roof.

Improved ventilating and other machinery is being daily introduced, and this field for invention is by no means neglected. But what the future may have in store can only be surmised, and meantime the realities of the present must be acted on by making use of all the appliances for safety already known with intelligence and sincerity, and not relying too much on inventions which may only come to light in distant ages.

Although accidents in coal mines are still very frequent, and deaths numerous—too numerous—the death-rate of the present time compares favourably

with that of past years. As no records were kept previous to the Inspection Act of 1850, it is only possible to institute comparisons from that date. For some years after the passing of this Act, little or nothing was known of its effects; and the benefits derived from inspection was doubted, or even denied, by many colliery proprietors.

During the discussion on the Bill of 1860, questions as to the actual result of mining inspection arose in the House of Commons, and Mr. Dillwyn moved for a return of the number of fatal accidents that had occurred in coal mines in the United Kingdom since the system of colliery inspection had come into operation; specifying the cause and the locality of such accident, and the relation between the number of accidents, the number of inspectors, and the amount of coal raised in each year. Accordingly, a table was prepared by Mr. Dickinson, inspector of mines, giving approximately the information demanded. In the early years of inspection, the returns made to the inspectors were incomplete. The first complete list of deaths was published in 1853, when the three inspectors then appointed made out the list of the deaths since 1851. Again, the production of coal was not registered until 1854, after Sir Charles Trevelyan and Sir Stafford Northcote had recommended, in an official report, that the Keeper of the Museum of Practical Geology be placed in communication with the inspectors of coal mines; and in 1855 the first return of the coal and iron produce of the country was obtained through direct application to the proprietors of works.

In the report of the Royal Commission on the

supply of coal, the production for the three years 1851, 1852, and 1853, is estimated at 50,875,000 tons per annum. Since 1854, the quantity of coal raised every year is duly registered, and amounts, for the ten years ending 1860, to 605,154,940 tons.

The return of accidents and deaths, made by Mr. Dickinson in 1860, has since then been completed by him and brought down to the year 1875. (See Appendix.)

Assuming the production of coal in 1851 to have been 50,875,000 tons, and taking the number of deaths recorded for that year, namely, 984, it appears that 51,702 tons of coal were raised for every life lost. Ten years later, that is during the year 1861, 86,039,214 tons of coal were raised, and 943 lives lost, giving 91,239 tons per life; thus shewing a ratio of improvement of 19.35 deaths in 1851, as compared with 10.95 deaths in 1861, for every million tons raised. In the year 1871 the coals raised amounted to 117,429,853 tons, and the lives lost to 1075, giving 9.15 deaths per million tons raised, and in 1876, the figures are 134,125,166 tons raised, and 933 lives lost, or 6.95 per million tons. It is, however, preferable to take a series of years for comparison rather than a single year, which may be exceptionally high or low.

Taking, therefore, decades, it appears that during the ten years ending 1860 the death-rate was 13.90; for the ten years ending 1870, it diminished to 10.90; and for the five years ending 1875, still further to 8.70 per million tons raised.

Now, comparing the death-rate during different periods with reference to the number of men employed, the results are as follows:—During the

decade ending 1860, the death-rate was one in every 245 employed; during the ten years ending 1870, it was one for every 300; and for the five years ending 1875, it was one in every 430 employed. That is to say, the deaths have been reduced from 4 to 2.30 per thousand employed. The most fatal cause of death is found to be the falls of roof or sides underground. Thus, in the decade ending 1860, the deaths from falls averaged 376.7 per annum, while those caused by explosions were 244.1; during the ten years ending 1870, the figures are 416.3 through falls, as compared with 226.7 through explosions; and for the five years ending 1875, the deaths under the first item were 450, and under the second 195.40. Again, the deaths through explosions have diminished from one in 1008 persons employed during the decade ending 1860 to one in 1408 for the same period ending 1870, and to one in 2864 for five years ending 1875, while those caused by falls of roof have decreased only in the ratio of one to 653, one to 767, and one to 1056 employed.

Thus the accidents caused by falls of roof are not only numerically greater, and cause more loss of life than those from colliery explosions, but during twenty-five years of inspection they have not diminished in the same proportion as the latter. The coal seams which are at present worked lie much deeper than those previously worked, and are much more charged with explosive gas, and consequently more difficult to ventilate, whereas the dangers caused through the breakage of roof have not increased, the deeper seams being just as easy to timber as the more shallow. Yet in this class of accident, mainly dependant on the

miner himself for prevention, the improvement is by no means so marked.

A glance at the following figures will show the annual average of lives lost during twenty-five years, classified under the several heads, and also the percentage attributable to each class of accidents.

1851—1860.

AVERAGE NUMBER OF LIVES LOST.

	Per annum.	Per cent.
Explosions	244.1	24.40
Falls of stone and roof ...	376.7	37.60
In shafts	211.9	21.20
Miscellaneous, underground ...	118.6	11.80
On the surface	50.5	5.00
Total average ...	1001.8	100.00

1861—1870.

Explosions	226.7	21.33
Falls of stone and roof ...	416.3	39.10
In shafts	150.5	14.15
Miscellaneous, underground ...	191.6	18.20
Surface	77.5	7.25
Total average ...	1062.6	100.00

1871—1875.

Explosions	195.4	17.80
Falls of stone and roof ...	450.8	41.00
In shafts	155.0	14.00
Miscellaneous, underground ...	211.0	19.20
Surface	88.6	8.00
Total average ...	1100.8	100.00

From these tables it will be seen that the relative loss of life through explosions has materially decreased during twenty-five years of colliery inspection.

The average loss of life during the first decade of inspection is seen to be 24.40 per cent. of the total loss; during the next decade the proportion is 21.30; and for the five years ending 1875 it falls to 17.80. On the other hand, the proportion of lives lost through falls of stone and roof has increased from 37.60 per cent. during the first decade; to 39.10 during the second; and 41.00 during the five years ending 1875. The other classes of accidents vary but little in proportion, and can be traced more clearly to unavoidable or unforeseen circumstances, carelessness, recklessness, and stupidity. But while the percentage of deaths through explosions shows an improvement in the management of the dangerous element of explosive gas underground, the increasing proportion of deaths through falls of stone or roof shows the necessity of attending to this branch of mining safety with more care.

The results we have obtained, after nearly thirty years legislation, have been, if not so great as the more sanguine supporters of colliery inspection had expected, at any rate sufficient to justify the action of the Legislature. If the state of our colliers and collieries at the present time be compared with that which obtained at the commencement of the century, the amelioration will be found so great that the previous state of things will appear barely credible. In the beginning of the century the colliers in Scotland had been just released from a bondage equal to slavery; the children of colliers of both sexes were huddled down the pits at tender ages to grow up ignorant, dissolute, and immoral. The lives of the colliers were so little valued that those who were killed by acci-

dents were often buried with unseemly haste, without inquest or inquiry. As late as 1814, a judge at assizes at Durham commented on the actual breach of the law in not holding inquests on the colliers who perished by the frequent pit accidents. Further, no record whatever was kept either of the number of people employed or the number of those who were killed by underground fatalities.

Since the introduction of Acts of Parliament, a large amount of statistical and general information has been recorded, which must be of material service in promoting improvement in the management of the mines and consequently diminishing the loss of life. On the other hand, the direct influence of the various Acts has been most beneficial. The employment of women and young children in such an occupation as coal-working underground, was a blot on the industry which had to be removed. The recorded figures of deaths and accidents show that, although the quantity of coal raised has risen from 50 millions in 1850 to 130 millions in 1875, the mining population has doubled, and the collieries become greatly extended, deeper, and more dangerous to work, yet the number of deaths remains about the same, while the average term of life is also apparently increased by improved ventilation. These results are by no means negative.

The education clauses have not been sufficiently long in operation to produce very tangible results. But it may be anticipated that by giving every collier's child the rudiments of education, some improvement in their social life will be attained, and that we shall get a steadier and more intelligent class of workmen. It may be noticed that the strikes of

the present day—and at no period have they been more numerous or more extensive—are not attended with the brutality and violence of former years.

At the present time, men who refuse to work on whatever grounds—whether justifiable or not, judicious or injudicious—are prepared to discuss their reasons at conferences, or submit their demands to arbitration, instead of taking the law into their own hands and fighting the battle of their supposed rights with brickbats and fire-brands.

How much of this result is attributable to the general advance of civilisation in the country, and how much to the direct influence of special Acts of Parliament, is a difficult matter to specify. One point is, however, quite clear, namely, that these Acts have had a tendency to increase the confidence of the mining population in the Government of the country, independently of political party. They see in the provisions of the various Acts the strong desire of the Legislature to protect the interests of the workpeople, as far as it can possibly be done without trenching unfairly on the rights of property.

That legislation was necessary is abundantly proved by the records of the past. It is a sad, but nevertheless a true, reflection that nearly every class of labour has required the protection of the State. The condition of our factory operatives was a most melancholy one before the Acts for the regulation of their employment were passed. The same may be said of almost every class of labour, and with special reason of the mining population, who, from the nature of their work, were liable to greater neglect than any other

branch of labour. In coal mines there existed a tendency on the side of owners to lay the blame of accidents on the recklessness or foolhardiness of the colliers, while the latter accused their employers of sacrificing safety to economy.

It became absolutely necessary to define the duties of both parties, where the lives of so many were jeopardised. The result has been, if not to prevent a loss of life underground, at least to diminish the number of casualties. By regulating the employment of boys, and making provision for their education, the social status of the mining population has been improved. The results obtained are in themselves sufficient for congratulation, but they are not completely satisfactory.

This fact has been forcing itself on the attention of those interested in the subject for some time, and quite recently the Government, having a sincere desire to promote any measure which might tend to the saving of human life and the improvement of the condition of the mining population, has appointed a Royal Commission for the purpose of "inquiring and reporting whether with respect to influence of fluctuations of atmospheric pressure upon the issue of fire damp from coal; to the adoption and efficient application of trustworthy indicators of the presence of fire damp; and generally to systematic observations of the air in mines; to improved methods of ventilation and illumination; to the employment of explosive agents in the getting of minerals; and to other particulars relating to mines and mining operations; the resources of science furnish any practical expedients that are not now in use, and are calculated to prevent

the occurrence of accident or limit their disastrous consequences."

It may not be out of place, in closing these pages, to express a confident hope that the labours of this commission will result in formulating some practicable scheme by which a greater saving of life underground may be effected.

APPENDIX No. I.

Table, shewing the number of fatal accidents and deaths, with the ratio to persons employed in Great Britain and Ireland, since the commencement of the inspection.

NOTE.—After 1872, fireclay, ironstone, and shale mines are comprised; and after 1873, Ireland is included. (*Report for the year 1875, by JOSEPH DICKINSON, Esq., Inspector of Mines.*)

	Accidents causing one or more deaths.						Persons employed.	Ratio of Persons to each Accident.					
	Fire Damp Explosions.	Roof and sides falling.	Shaft.	Miscellaneous under ground.	Miscellaneous above ground.	TOTAL.	Above ground and below ground.	Fire Damp Explosions.	Roof and sides falling.	Shaft.	Miscellaneous under ground.	Miscellaneous above ground.	TOTAL.
ACCIDENTS.													
Average of 10 years ending 1880	82.0	361.1	183.7	100.3	46.8	773.9	246,032.2	3000	661	1339	2453	5257	318
Year 1870	56.5	408.1	133.3	156.1	73.8	823.8	319,240.5	5650	792	2394	2045	4326	388
„ 1871	58	426	118	161	69	826	370,881	7132	870	3143	2303	5375	448
„ 1872	68	445	131	179	77	894	418,068	6743	939	3191	2335	5429	468
„ 1873	44	474	158	211	86	973	512,199	11,641	1060	3343	2427	5955	536
„ 1874	44	408	145	200	108	895	538,829	12,246	1337	3716	2694	5231	602
„ 1875	41	440	153	196	97	927	535,845	13,069	1217	3502	2733	5524	578
DEATHS.													
Average of 10 years ending 1880	244.1	376.7	211.9	118.6	50.5	1001.8	246,032.2	1008	653	1161	2074	4872	245
Year 1870	226.7	416.3	150.5	191.6	77.5	1062.6	319,240.5	1408	767	2121	1686	4119	300
„ 1871	269	435	123	176	72	1075	370,881	1378	852	3015	2107	5151	345
„ 1872	154	456	135	217	78	1080	418,068	2714	916	2697	1926	5360	394
„ 1873	100	491	171	221	86	1069	512,199	5122	1043	2995	2317	5955	479
„ 1874	166	413	154	214	109	1056	538,829	3245	1304	3496	2517	4943	510
„ 1875	288	459	172	237	96	1244	535,845	1860	1167	3115	2390	5467	430

APPENDIX No. II.

List of Serious Colliery Explosions previous to 1850.

DATE.	NAME OF COLLIERY.	LIVES LOST.
1675, February 3rd . . .	Mostyn, North Wales . . .	Several
1708, August 18th . . .	Fatfield, Chester-le-Street . . .	69
1710, ——— . . .	Bensham, Newcastle . . .	70 to 80
1743, January 18th . . .	North Biddick, Gateshead . . .	17
1757, June 10th . . .	Ravenaworth, Newcastle . . .	16
1766, March 18th . . .	Walker, Newcastle . . .	10
1767, February 27th . . .	Fatfield, Chester-le-Street . . .	39
1778, December 8th . . .	Chaytor Haugh, Newcastle . . .	24
1793, December 27th . . .	Sherriff Hill, Gateshead . . .	14
1794, June 9th . . .	Picton . . .	30
„ „ 11th . . .	Harraton, Chester-le-Street . . .	28
1795, April 24th . . .	Benwell, Newcastle . . .	11
1799, October 11th . . .	Lumley Fence houses . . .	39
1803, September 25th . . .	Wallsend, North Shields . . .	13
1805, October 21st . . .	Hepburn, Newcastle . . .	35
„ November 29th . . .	Oxclose . . .	38
1806, March 28th . . .	Killingworth, Newcastle . . .	10
1809, September 14th . . .	Killingworth „ . . .	12
1812, May 25th . . .	Felling „ . . .	92
„ October 10th . . .	Herrington, Durham . . .	24
1813, September 28th . . .	Fatfield . . .	32
„ December 24th . . .	Felling, Newcastle . . .	22
1814, August 12th . . .	Hepburn „ . . .	11
1815, June 2nd . . .	Newbottle Fence houses . . .	57
„ „ 27th . . .	Sherriff Hill, Newcastle . . .	11
1817, „ 30th . . .	Harraton, Chester-le-Street . . .	38
„ December 18th . . .	Rainton Fence houses . . .	27
1819, July 19th . . .	Sherriff Hill, Newcastle . . .	35
„ October 9th . . .	Lambton, Durham . . .	13
1821, „ 23rd . . .	Wallsend, North Shields . . .	52

DATE.	NAME OF COLLIERY.	LIVES LOST.
1823, November 3rd . . .	Rainton Fence houses . . .	59
1824, " 19th . . .	Newbottle, Durham . . .	11
" October 25th . . .	Lumley " . . .	14
1825, July 3rd . . .	Fatfield, Chester-le-Street . . .	11
1826, May 30th . . .	Townley, Durham . . .	38
" June 17th . . .	Jarrow, Newcastle . . .	34
1828, May 20th . . .	Flint, Flintshire . . .	11
" November 28th . . .	Washington, Durham . . .	14
1830, April 24th . . .	Pemberton, Wigan . . .	9
" August 3rd . . .	Jarrow, Newcastle . . .	42
1833, May 9th . . .	Springwell " . . .	47
1835, June 18th . . .	Wallsend " . . .	102
1836, " 25th . . .	Hetton, Durham . . .	20
1837, December 6th . . .	Springwell, Newcastle . . .	27
1838, October 24th . . .	Lowca, Whitehaven . . .	35
1839, February 18th . . .	William Pitt, Cumberland . . .	23
" June 28th . . .	St. Hilda, South Shields . . .	52
1843, April 7th . . .	Stormont Main, Newcastle . . .	27
1844, September 28th . . .	Haswell, Newcastle . . .	95
1845, February 4th . . .	Haye's Wood, Somerset . . .	10
" August 2nd . . .	Crombach, South Wales . . .	28
" " 21st . . .	Jarrow, Newcastle . . .	39
1846, January 14th . . .	Risca, Monmouth . . .	35
" November 17th . . .	Round's Green, Oldbury . . .	19
1847, March 6th . . .	Ardsley Main, Barnsley . . .	72
" May 17th . . .	Beeston, Leeds . . .	9
1848, March 29th . . .	Eagle Bush, Neath . . .	19
" October 28th . . .	Whinny Hill, Whitehaven . . .	30

NOTE.—This list is necessarily incomplete from want of records.

*List of Colliery Explosions, entailing loss of Six lives and upwards,
since 1850, compiled from the Reports of the Inspectors of
Mines.*

DATE.	NAME OF COLLIERY.	LIVES LOST.
1850, March 16th . . .	Haydock, Ashton	13
" June 5th	Little Usworth, Durham	11
" October 10th	Bent Grange	16
" November 7th	Haydock, Ashton	9
" " 12th	Houghton, Durham	26
" December 12th	Duffryn, Aberdare	8
1851, March 15th	Nitshill, Paisley	61
" August 18th	Washington, Durham	35
" October 21st	West Moor, Newcastle	9
" December 20th	Rawmarsh, Yorkshire	52
1852, April 23rd	Pemberton, Wigan	12
" May —	Morley Hall "	10
" " 6th	Hepburn, Shields	22
" " 10th	Middle Duffryn, Aberdare	65
" " 20th	Cappull, Preston	36
" December 22nd	Elsecar, Barnsley	9
1853, March 12th	Risca, Monmouth	10
" " 23rd	Arley, Wigan	58
" April 26th	Old Park, Dudley	11
" July 1st	Bent Grange, Lancashire	20
1854, February 18th	Ince Hall, Wigan	89
1855, May 25th	Old Field, Longton	7
" August 21st	Lundhill, Barnsley	6
1857, February 19th	" "	189
" May 20th	Kirkless Hall, Wigan	9
" " 27th	Tyr Nicholas, Wales	13
" July 31st	Heys, Ashton-under-Lyne	40
1858, February 2nd	Bardsley, "	53
" " 25th	Lower Duffryn, Aberdare	19
" May 28th	Bryndu, Tailbach	12
" December 11th	Tyldesley, Leigh	25

DATE.	NAME OF COLLIERY.	LIVES LOST.
1860, February 15th . . .	Higham, Barnaley	13
„ March 3rd . . .	Burradon, Durham	76
„ August 3rd . . .	Winstanley, Wigan	13
„ November 6th . . .	Lower Duffryn, Aberdare	12
„ December 1st . . .	Blackvein, Risca	142
„ „ 20th . . .	Hetton, Durham	22
1861, March 8th . . .	Blaengwawr, Aberdare	13
1862, January 22nd . . .	Hartley, Newcastle	204 (suff.)
„ February 19th . . .	Cethin, Merthyr Tydfil	47
„ November 22nd . . .	Walker, Newcastle	16
„ December 8th . . .	Edmundsmain, Barnaley	59
1863, March 6th . . .	Coxlodge, Newcastle	26
„ October 17th . . .	Morfa, Port Talbot	39
1865, June 16th . . .	Tredegar, Monmouth	26
„ December 20th . . .	Cethin Cyfartha, Merthyr Tydfil	34
1866, January 23rd . . .	Park Lane, Wigan	30
„ May 4th . . .	Garswood Park, St. Helen's	12
„ October 30th . . .	Pelton, Chester-le-Street	24
„ December 12th . . .	Oaks, Barnaley	361
1867, August 20th . . .	Garswood Park, St. Helen's	14
„ November 8th . . .	Ferndale, Pontypridd	178
1868, September 30th . . .	Wynnstay, Ruabon	10
„ November 28th . . .	Hindley Green, Wigan	62
„ December 26th . . .	Haydock, St. Helen's	26
1869, April 1st . . .	High Brooks, Wigan	37
„ June 10th . . .	Ferndale, Pontypridd	53
„ July 21st . . .	Haydock, St. Helen's	59
„ October 22nd . . .	Newbury, Somersetshire	11
„ November 15th . . .	Low Hall, Wigan	27
1870, February 14th . . .	Morfa, Taibach	30
„ July 7th . . .	Silverdale, Newcastle-under-Lyne	19
„ „ 23rd . . .	Charles, Llansamlet	19
„ August 19th . . .	Brynn Hall, Wigan	20
1871, January 10th . . .	Renishaw Park, Chesterfield	26
„ February 24th . . .	Pentre, Pontypridd	38
„ March 2nd . . .	Victoria, Monmouth	19
„ September 6th . . .	Ince Moss, Wigan	70
„ October 25th . . .	Seaham, Sunderland	26

DATE.	NAME OF COLLIERY.	LIVES LOST.
1872, February 14th . .	Maesteg Merthyr, Bridgend . .	11
„ March 28th . .	Lovers' Lane, Atherton . . .	27
„ October 7th . .	Morley, Leeds	34
1873, February 5th . .	Talke, Newcastle-under-Lyne . .	18
1874, April 14th . .	Astley Pit, Dukinfield . . .	54
„ July 18th . .	Ince Hall, Wigan	15
„ November 20th . .	Rawmarsh, Rotherham . . .	23
„ December 24th . .	Signall Hill, Newcastle-under-Lyne	17
1875, April 30th . .	Bunker's Hill, Kidsgrove . .	43
„ December 4th . .	New Tredegar, Monmouth . .	23
„ „ 6th . .	Llan, Cardiff	16
„ „ 6th . .	Swaith Main, Barnsley . . .	143
1876, December 18th . .	South Wales, Monmouth . . .	23
1877, January 23rd . .	Stone Hill, Farnworth . . .	18
„ February 7th . .	Foggs, Darcy Lever	10
„ March 10th . .	Weigfach, Swansea	18
„ October 11th . .	Pemberton, Wigan	36
„ October 22nd . .	Blantyre, Lanark	207

APPENDIX No. III.

*Acts passed or orders made by the Parliament of Scotland regarding
Coal mines and Colliers.*

1606. Jacobi VI. Act anent Coilziaris and Saltaris.

Na persone within this realme heirefter sall fle, hyre, or conduce ony salteris coilzearis or coilberaris without ane sufficient testimoniall of their maister quhom they last servit,

1621. Jacobi VI. Commissione anent Coallis and Coilheghes.

(To examine and report on the condition of certain Collieries.)

1661. Carolus II. Act anent Coal-hewers. Ratifies the elevent Act of the 18 Par. of K: Ja: 6: of worthie memory, with the addition of watermen who laves and gatesmen who work the wayes and passages in the heughs.

1696. Gulielmi. Overture for working Levells and Sinks to Mines and Coall Pitts.

1698. Gulielmi. Act for repairing of Highwayes and filling up of Coall Pitts.

1700. Gulielmi. Overture for an Act anent Coal and Salt.

1703. The draught of an Act for reviving an Act past in the twelvth Parliament of King James the Sixth anent Mines and Minerals.

APPENDIX No. IV.

*Acts passed by the Parliament of Great Britain regarding the
Regulation and Inspection of Mines and Miners.*

1775. (15 Geo. III., c. 28.) An Act for altering, explaining, and amending several Acts of the Parliament of Scotland respecting Colliers, Coal-bearers, and Salters.

1799. (39 Geo. III.) An Act to explain and amend the Laws relative to Colliers in that part of Great Britain called Scotland. [13th June, 1799.]

1800. (39 and 40 Geo. III., c. 77.) An Act for the Security of Collieries and Mines, and for the better Regulation of Colliers and Miners. [9th July, 1800.]

✓ 1817. (57 Geo. III., c. 122.) An Act to extend the Provisions of an Act of the Twelfth year of His late Majesty King George the First, and an Act of the Twenty-second year of His late Majesty King George the Second, against Payment of Labourers in Goods or by Truck, and to secure their Payment in the lawful Money of this Realm, to Labourers employed in the Collieries, or in the working and getting of Coal, in the United Kingdom of Great Britain and Ireland; and for extending the Provisions of the said Acts to Scotland and Ireland. [11th July, 1817.]

1827. (7 and 8 Geo. IV., c. 30.) An Act for consolidating and amending the laws in England relative to malicious Injuries to Property. [21st June, 1827.] Repealed by Act of 1837.

✓ 1831. (1 and 2 Will. IV., c. 36.) An Act to repeal several Acts and parts of Acts prohibiting the Payment of Wages in Goods, or otherwise than in the current Coin of the Realm. [15th October, 1831.]

1837. (1 Vict. c. 89.) An Act to amend the Laws relating to burning or destroying Buildings and Ships. [17th July, 1837.]

{ 1842. (5 and 6 Vict., c. 99.) An Act to prohibit the Employment of Women and Girls in Mines and Collieries, to regulate the Employment of Boys, and to make other Provisions relating to Persons working therein. [10th August, 1842.]

1850. (13 and 14 Vict., c. 100.) An Act for Inspection of Coal Mines in Great Britain. [14th August, 1850.] Repealed by Act of 1855.

1855. (18 and 19 Vict., c. 108.) An Act to amend the Law for the Inspection of Coal Mines in Great Britain. [14th August, 1855.]

1860. (23 and 24 Vict., c. 151.) An Act for the Regulation and Inspection of Mines. [28th August, 1860.] Amended by Act of 1862.

1861. (24 and 25 Vict., c. 96.) An Act to consolidate and amend the Statute Law of England and Ireland relating to Larceny and other similar offences. (Stealing Ore of Metal, Coal, &c., by Miners or others.) [6th August, 1861.]

1861. (24 and 25 Vict., c. 97.) An Act to consolidate and amend the Statute Law of England and Ireland relating to Malicious Injuries to Property. (Injuries to Mines.) [6th August, 1861].

1862. (25 and 26 Vict., c. 79.) An Act to amend the Law relating to Coal Mines. [7th August, 1862.]

1872. (35 and 36 Vict., c. 76.) An Act to consolidate and amend the Acts relating to the Regulation of Coal Mines, and certain other Mines. [10th August, 1872.]

1872. (35 and 36 Vict., c. 77.) An Act to consolidate and amend the Law relating to Metalliferous Mines. [10th August, 1872.] Repealed in part by Act of 1875. (8.)

1875. (38 and 39 Vict., c. 17.) An Act to amend the Law with respect to manufacturing, keeping, selling, carrying, and importing Gunpowder, Nitro-glycerine, and other explosive substances. [14th June, 1875.] (Application of Act of 1872 to magazines used for mines.)

1875. (38 and 39 Vict., c. 39.) An Act to amend the provisions of the Metalliferous Mines Regulation Act, 1872, with respect to the annual Returns from Mines. [19th July, 1875.]

1876. (39 and 40 Vict., c. 79.) An Act to make further provision for Elementary Education. [15th August, 1876.]

APPENDIX No. V.

Production of Coal at Different Times.

Years.	Amount of Coal raised in the Kingdom, in tons.		
1660	2,148,000	Estimate of Royal Commission on Coal, 1871	
1700'	2,612,000	" "	
1750	4,773,823	" "	
1770	6,205,400	" "	
1780	6,424,976	" "	
1785	6,888,712	" "	
1790	7,618,760	" "	
1795	10,631,723	" "	
1800	10,080,300	" "	
1816	27,020,115	" Samuel Salt	
1839	31,024,417	" J. R. McCulloch	
1845	34,600,000	" "	
1800 to 1850 (average)	40,000,000	" Royal Commission	
1850	50,875,000	" "	
1860	84,042,698	Official Returns	
1870	112,875,525	" "	
1875	133,306,486	" "	

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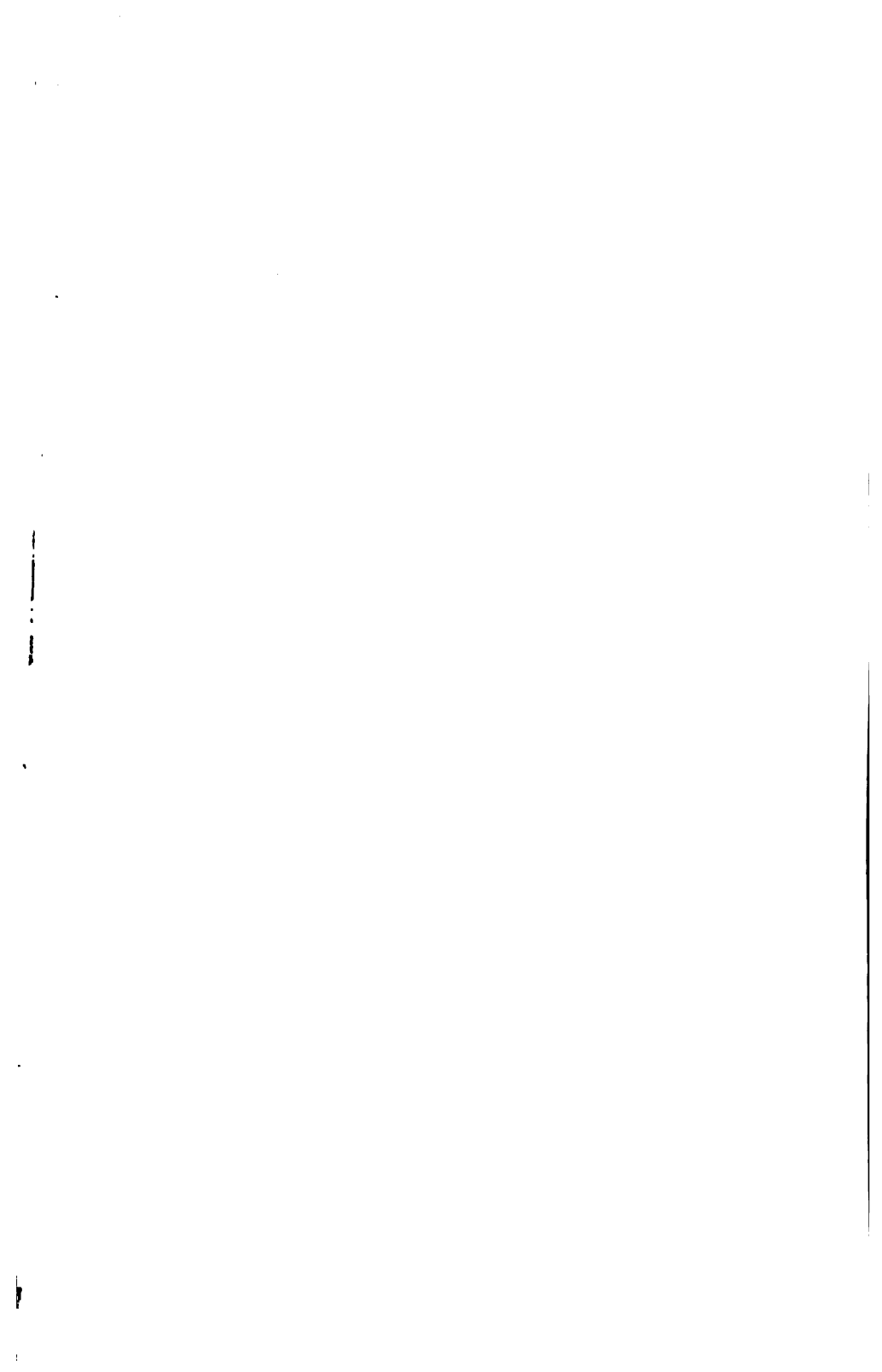
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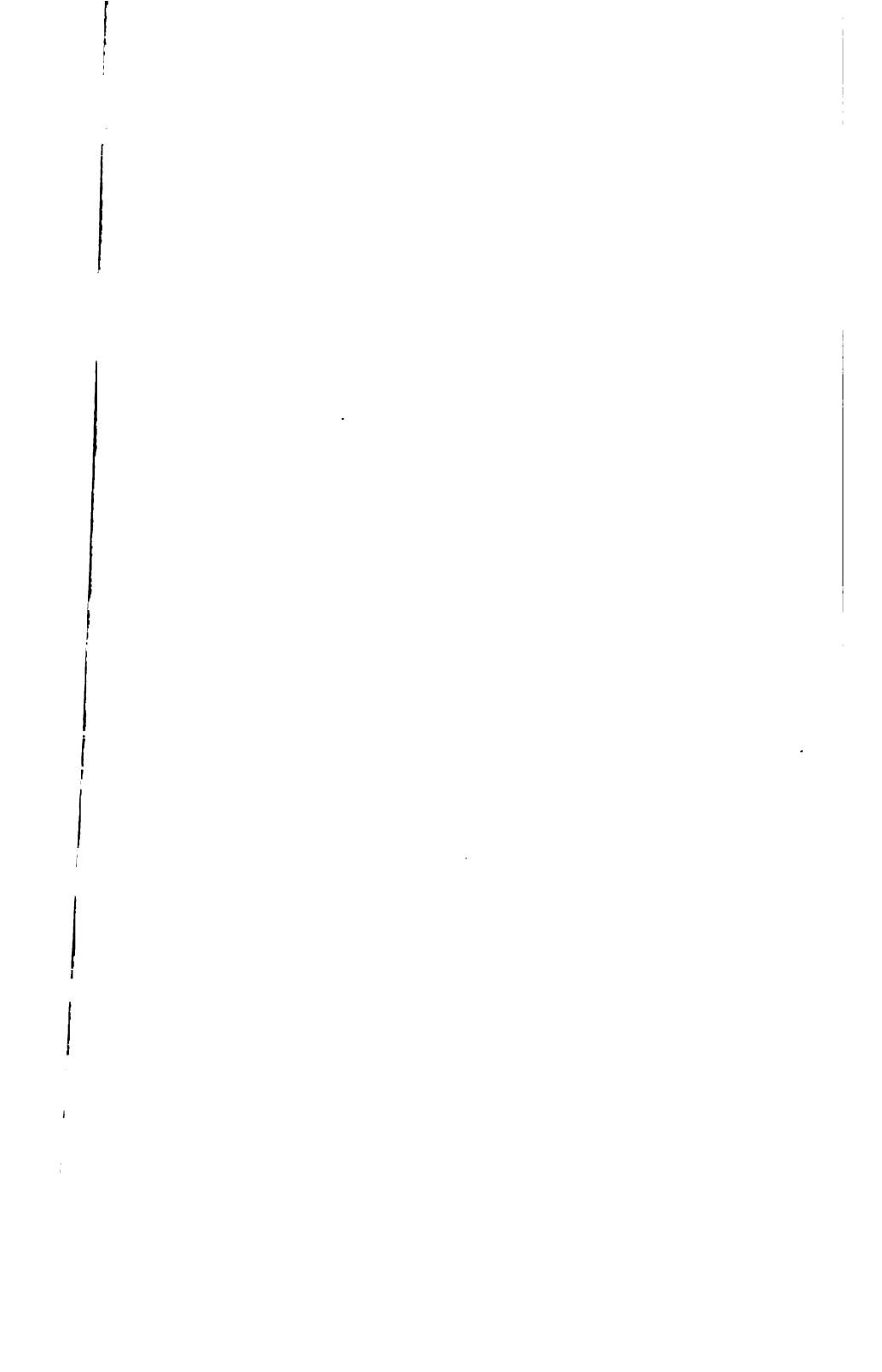
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